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CHEMICAL AGE

BOUVERIE HOUSE · 154 FLEET STREET · LONDON · EC4

HYDROCARBON SOURCE

SEWAGE SLUDGE is decomposed to its least offensive form by an anaerobic biological process. At the same time gaseous decomposition products which contain methane are liberated. This gas could be used as a source of power if its production were not so unpredictable. Modification of the process could possibly result in a reliable yield of gas. This would be of economic value, and if, at the same time, the fuel value and quantity of gas produced were increased for little expenditure, a valuable source of hydrocarbon would be available.

Since an increased calorific value of the sludge gas is one objective, this could, it is believed, be extended to bring about an increased calorific value to a commercial gas such as producer gas or water gas, when incorporated into the system. Also, being a biological system, the process would provide a cheap source of production of high-molecular-weight hydrocarbons, should it be capable of bringing about a change from simple hydrocarbons.

It is with these objects in mind that research is being carried out by M. B. Pescod, public health engineer, in the department of civil engineering, public health engineering section of King's College, University of Durham.

Until 1936, difficulty was experienced in obtaining methane-producing bacteria in pure culture. However, four species of methane bacteria have been isolated in strictly pure culture. In anaerobic decomposition in nature or sewage sludge, conversion of substrates to methane is a two- or multi-stage biological process, with the methane producer carrying out the last stage.

Methane fermentation chemistry is rather complex and no theory of action is entirely satisfactory. The mainly accepted theory is that of carbon dioxide reduction. Thus, it is postulated that the organic compounds fermented by methane bacteria are oxidised completely to carbon dioxide, and this oxidation is coupled with a reduction of some or all of the carbon dioxide to methane.

Observations by Sohngen in 1910 on the fermentation of a mixture of hydrogen and carbon dioxide provided the main evidence for the above theory, for enrichment cultures could couple the oxidation of hydrogen with the reduction of carbon dioxide to methane. Information from various laboratories indicates that the theory is correct for fermentation of many substrates.

Gas evolved in the anaerobic digestion process of sewage sludge normally contains about 70 per cent methane and 20 per cent carbon dioxide. It is emphasised that the amounts of these constituents would be dependent upon the substrate and also upon the stage of the digestion.

Previously, estimation of trace quantities of hydrocarbons in sludge gas posed quite a problem, and indeed some years back was insoluble. With the present-day thermal conductivity and gas chromatography techniques, however, there are possibilities for their measurement. Adsorption chromatography would seem to be the most effective method, although the cost of the necessary equipment would be high.

Pescod's work at Durham on this project to date has been mainly concerned with the investigation and acceptance of techniques and equipment and also

in obtaining a suitable sludge for the work to be carried out. Obtaining a fully worked-out sludge, with negligible gas production, will be a long-term project.

A suitable gas-circulation system, which will be required for later studies, has been worked out together with an alternative to this gas-circulation system where the use of a pump would not be required. The alternative system, it is believed, might show a greater efficiency from the intimate mixing of gas and sludge. Plans are also in hand for the measurement of the major constituents of the sludge gas by an Orsat gas-analysis apparatus.

The primary aim of this research is, of course, the evaluation of conditions under which optimum reduction of carbon dioxide to methane takes place, and the stage in the digestion process which most suitably brings about this reduction.

FERTILISER MARKET IN RHODESIA

IMPORTS of fertilisers into the Federation of Rhodesia and Nyasaland were increased by 139,019 tons in 1956, to a total of 2,369,635 tons. This represents approximately the country's consumption during the year under consideration, as there is no domestic production of fertilisers.

Three companies are concerned with the import of fertilisers as also with other chemical products. These are African Explosives and Chemical Industries (Rhodesia) Ltd., Fisons Rhodesia Ltd., and Windmill Fertilisers Rhodesia Ltd. Fertilisers are imported from South Africa as follows: phosphate fertilisers about 50,000 tons followed by potassic and nitrogenous fertilisers.

Expressed in tons of fertiliser elements the consumption of fertiliser during 1955–56 was 18,400 tons of P_2O_5, 10,700 tons of K_2O and 8,700 tons of nitrogen, being a total of 37,800 tons. An important part of this consumption was absorbed in the form of compound fertilisers some of which were imported as such, and others prepared in the country. It should be noted that fertiliser consumption is very much higher in the Federation than in other countries of central Africa. Thus, the consumption in 1955–56 was 14,500 tons of fertilisers (elemental) in British East Africa, and 2,200 tons in the Belgian Congo, this representing 68.6 lb. of fertiliser elements per 100 hectares of arable land and of prairies in East Africa and 8.01 lb. in the Belgian Congo, compared with 187.2 lb. in the Federation.

It is estimated that consumption will be increased by 180,000 tons in 1959, following the start of operations of a superphosphate factory, now under construction near Salisbury, by African Explosives and Chemical Industries. This plant will produce simple superphosphates (19 per cent P_2O_5) and triphosphates (45 per cent) and sulphuric acid from local pyrites. Raw phosphates will be imported initially but the hope has been expressed that these imports will be progressively reduced by the exploitation of local deposits of apatite located at Dorowa, 60 miles to the south-east of Odgi.

As to sulphuric acid, local production is expected to satisfy demand and to eliminate also the heavy charge associated with transport of this product. Cost of the new superphosphate factory is estimated at about £3 million. It is considered that production will be sufficient to meet the Federation's needs for some years.

The possibility of constructing a nitrogen fertiliser factory in Rhodesia having an annual capacity of 25,000 tons is also being considered. Manufacture would be based on exploiting coke gas, consequent on the expansion of the Federation's steel industry.

Such a factory would cost between £5 and £7 millions but it is considered that it would enable nitrogen fertiliser to be produced for a price of £10 to £15 a ton. The price of nitrogen fertiliser imported from Europe is at least £24 a ton. Consumption of nitrogen fertiliser in 1960 is estimated at 20,000 tons and in 1970, at 40,000 tons.

As a whole, fertiliser consumption in the Federation is as yet very small, but it is believed that the production of fertilisers in the country will favour the plans to develop its home agriculture and raise the standard of living.

AUSTRALIAN COAL CHEMICALS

THE possibility of a coal-based chemical and liquid fuel industry is under discussion in Australia. In fact, such is the interest in this industry that a committee has been appointed to investigate the matter.

Since the middle of last year two working parties of the committee have been studying the fluidised low temperature carbonisation of coal to produce char, gas and tar. The group investigating the practicability of burning char under boilers is reported as awaiting the advice from the overseas principals of boiler manufacturing companies who have been consulted in the matter. It is considered, however, that it will be possible to burn char under boilers, particularly as it is known that in the US there are several large installations planned to use char produced from bituminous coal or lignite.

A second group is studying the economic value of tar as compared with petroleum. This is a very important part of the investigation, involving as it does, estimates of capital and running costs of a low temperature fluidised carbonisation plant. The first draft of the group's report is now being prepared.

Much research is at present being carried out throughout the world on processes and the economics of producing oil and chemicals from coal. The Australian committee is known to be keeping in touch with such investigations and its own findings are in turn being made known.

It is also known that the Commonwealth Scientific and Industrial Research Organisation (CSIRO, Melbourne) has developed a fluidised bed process of gasifying lignite with hydrogen to produce methane. During an experimental run using the process a methane yield of 10.1 cu. ft./lb. of coal, 75 per cent of which was gasified, was obtained.

In the process, lignite is introduced into a fluidised bed at 300 to 600 p.s.i. at 500°C to 850°C as a suspension in a hydrogenating gas stream in the ratio of 20 to 140 cu. ft./lb. of gas to coal.

A high degree of gasification and a product of high calorific value have not yet been obtained at the same time, state CSIRO. Results indicate, however, that for the same degree of gasification, this fluidised bed process produces more methane and absorbs less hydrogen due to the instantaneous heating of fluidised particles.

OEEC FERTILISER PRODUCTION CONTINUES UPWARD TREND

Seventh European Study Published

IN OEEC countries, the upward trend in fertiliser production was maintained in 1956–57. Output, particularly of nitrogen, showed a higher rate of increase than in the previous year. This is the conclusion of the '7th study, 1955–1958 on fertilisers—production, consumption, prices and trade—in Europe', prepared by the Committee of Deputies of the Ministerial Committee for Agriculture and Food and the Chemical Products Committee, which has just been published by the Organisation for Economic Co-operation (OEEC).

Nitrogenous fertilisers: It is reported that production of nitrogenous fertilisers increased by 11 per cent and consumption by 8 per cent in 1956–57. Total imports rose by 5 per cent, although imports from non-member countries fell. Exports, however, increased by 20 per cent.

Although there was some slackening in the rate of increase in nitrogenous fertiliser production in 1955–56, the expansionist trend in this industry is reported as not yet losing its momentum. Output in 1956–57 was 86 per cent higher than in 1949–50 and in 1957–58 was expected to be more than double. An increase of 14 per cent production and 6 per cent in consumption is suggested for 1957–58. However, some slowing down in the rate of expansion of production is foreseen for the following year when OEEC countries will have about 50 per cent more nitrogenous fertilisers available for export than in 1956–57.

TABLE 1
Nitrogen Production in OEEC Countries

	1954–55	1955–56	1956–57(1)	1957–58(2)	1958–59(2)
In million metric tons of N. ...	2.62	2.71	3.01	3.42	3.74
Percentage increase compared with previous year	+12	+3	+11	+14	+9

(1) Preliminary.
(2) Forecast.

Production of the two principal types of nitrogenous fertiliser manufactured in Western Europe, ammonium sulphate and ammonium nitrates, which are stated together to account for about 70 per cent of all nitrogenous fertiliser made, rose by only 5 per cent and 4 per cent respectively in 1956–57 over 1955–56.

Production of 'other nitrogenous fertilisers', of which urea is probably the most important, nearly trebled in 1956–57 compared with 1955–56. Output of calcium cyanamide increased by 34 per cent and output of complex fertilisers (in terms of N. content) by 25 per cent. For the smallest producers of nitrogenous fertilisers, Iceland, Switzerland and Turkey, production is reported as stable for 1956–57. Elsewhere there was a noticeable rise in output.

In Germany, production was 17 per cent higher and 19 per cent higher in Norway in 1955–56. It is noted, however, that Norwegian production of nitrogenous fertilisers was abnormally low in 1955–56 owing to the lack of hydro-electric power. Sweden, a small producer, showed the highest rate of increase (26 per cent).

PRODUCTION

- **Nitrogen production up by 11 per cent (3 per cent in 1955-56).**
- **Potash production rose by 5 per cent—1 per cent higher.**
- **Phosphate production increased by 4 per cent—a 1 per cent increase.**
- **An even higher rate of increase in nitrogenous fertiliser production (14 per cent) is expected in 1957-58.**
- **Between 1 July 1955 and 1 July 1956 production capacity for nitrogenous fertilisers in OEEC countries increased by 9 per cent, and potash capacity by 7 per cent. Phosphate capacity remained stable.**

Spain's production fell, however, by 3 per cent in 1956–57.

Production capacity in OEEC countries for nitrogenous fertilisers at 1 July 1957, amounted to about 3,621,000 tons of nitrogen, a 9 per cent increase over that at 1 July 1956.

Intra-European trade in nitrogenous fertilisers, in terms of imports, increased by 13 per cent in 1956–57, although it is still below the level of 2 years ago. Imports (80 per cent of which is sodium nitrate) from non-member countries fell by nearly a quarter. Total exports of nitrogenous fertilisers, however, after remaining stable in 1954–55 and 1955–56, rose by nearly 20 per cent in 1956–57. Ammonium sulphate exports remained stable, but increased quantities of the other types of nitrogenous fertilisers were exported.

A 36 per cent increase occurred in exports to non-member countries in 1956–57; exports to OEEC countries (including overseas territories) remained stable.

The rate of consumption of nitrogen has continued to rise steadily since 1949–50 and is not expected to change in the next two years. Usage is now 60 per cent higher than at the beginning of the decade. In 1956–57 the quantity of nitrogen used per hectare of agricultural land was the highest yet recorded for OEEC countries. There was a noticeable increase in usage (over 10 per cent) in Austria, Greece and Portugal and in Germany and Norway. Due to shortage of currency, nitrogen consumption in Turkey was lower in 1956–57 than in the previous year.

TABLE 2
Nitrogen Consumption in OEEC Countries

	1954–55	1955–56	1956–57(1)	1957–58(2)	1958–59(2)
In million metric tons of N. ...	1.92	2.05	2.21	2.35	2.5
Percentage increase over previous year	+7	+7	+8	+6	+7
In kg./ha. of agricultural area (omitting rough grazings) as an average for all OEEC countries ...	15.1	15.9	17.1	18.1	19.3

(1) Preliminary.
(2) Forecast.

Nitrogen in complex fertilisers showed a greater rise in consumption than the straight form although this was slightly lower than in the previous year. Less sodium nitrate was used in 1956–57 than in the previous period.

Phosphate fertilisers: In 1956–57, production of phosphate fertilisers increased by 4 per cent and consumption by 6 per cent. The situation is expected to remain stable in 1957–58 and the OEEC report further suggests that production and consumption of these fertilisers have settled down to a gradual rate of increase of 3 to 4 per cent annually. Imports are quoted as having increased by 23 per cent and exports by 13 per cent.

TABLE 3
Phosphate Fertiliser Production in OEEC Countries

	1954–55	1955–56	1956–57(1)	1957–58(2)
In million metric tons of P_2O_5	2.94	3.02	3.14	3.15
Percentage compared with previous year ...	+11	+3	+4	+0.3

(1) Preliminary.
(2) Forecast.

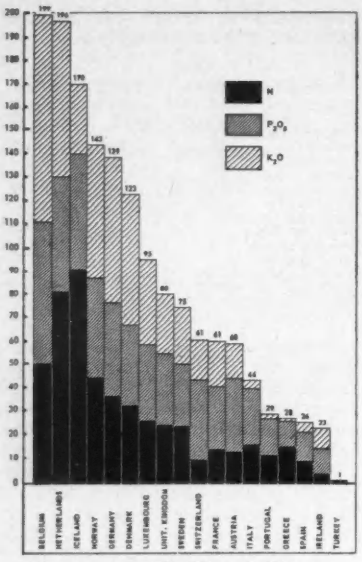
Compared with the rapid increase in production of phosphate fertilisers between 1953 and 1955 output rose relatively slowly in 1955–56 and 1956–57. It is expected to remain stable in 1957–58. Compared with other fertilisers, phosphate fertiliser production has only increased by 50 per cent.

Basic slag output increased by 10 per cent, but production of complex fertilisers showed the largest increase, being 23 per cent higher (in terms of P_2O_5 content) than in the previous year. There was a fall in output of single superphosphate and ground phosphate.

EXPORTS

- **Nitrogenous fertiliser exports from OEEC countries to non-member countries rose by 36 per cent in 1956-57, potash fertiliser exports dropped by 15 per cent and phosphate fertilisers by 20 per cent.**

Output rose in eight of the 17 OEEC countries in 1956–57, but was most marked in Norway (+ 35 per cent) and Germany (+ 20 per cent). Production in Germany had fallen in 1955–56, however, compared with the previous year; the increase in 1956–57 output, compared with 1954–55 was 12 per cent. Phosphate fertiliser (superphosphate only) production in Spain



Consumption of fertilisers in Kg. per hectare, 1956-57

was 10 per cent higher in 1956–57 than in the previous year.

Capacity for production of phosphate fertilisers was unchanged at 4,069,000 tons on 1 July 1957 when compared with the previous year. Capacity has increased by about 50,000 tons for production of complex fertilisers and 'other phosphate fertilisers'.

Exports of phosphate fertilisers rose less than imports, and exports to non-member countries were 12 per cent lower than in 1955–56. Basic slag exports, which represent nearly 60 per cent of total phosphate fertiliser exports, rose by 13 per cent, in spite of a decline in shipments to non-OEEC countries. Exports of concentrated superphosphates increased by a third in 1956–57.

Of the major exporters, Luxembourg increased exports of basic slag in 1956–57 by 19 per cent. Exports from the Netherlands rose by 12 per cent in spite of a fall of more than a tenth in shipments of single superphosphates. Exports of concentrated superphosphates increased, however, and are stated to account for nearly 50 per cent of the Netherlands' total phosphate exports.

Consumption of phosphate fertilisers increased by 6 per cent in 1956–57 compared with the 3 to 4 per cent a year since 1954. The level of consumption is expected to remain the same for most countries in 1957–58.

Austria, Germany, Greece and Norway increased their consumption of phosphate fertilisers in 1956–57, but Ireland, Italy and the UK show a decrease in consumption.

With the exception of single superphosphates and ground phosphates, consumption of all types of phosphate fertiliser increased in 1956–57. The greatest increase was in basic slag with 120,000 tons more being used than in the previous year. Consumption of complex fertilisers showed the highest relative increase, having risen by 24 per cent since 1955–56.

Potash fertilisers: A 5 per cent increase in production of potash fertilisers is recorded for OEEC countries in 1956–57 and a 4 per cent increase in consumption. This is less than the average yearly increase since 1949–50. Trade in potash fertilisers, however, rose by 9 per cent in 1956–57 compared with the previous year.

TABLE 4
Phosphate Consumption in OEEC Countries

	1954–55	1955–56	1956–57(1)	1957–58(2)
In million metric tons of P_2O_5	2.65	2.74	2.9	2.93
Increase as a percentage over previous year	+4	+3	+6	+1
In kg./ha. of agricultural area (omitting rough grazings) as an average for all OEEC countries	20.8	21.2	22.4	22.8

(1) Preliminary.
(2) Forecast.

TABLE 5
Potash Production in OEEC Countries

	1954–55	1955–56	1956–57(1)	1957–58(2)
In million metric tons of K_2O	2.78	2.88	3.02	3.13
Percentage compared with previous year ...	+15	+4	+5	+4

(1) Preliminary.
(2) Forecast.

Only a 4 per cent increase in production and a 3 per cent increase in consumption is expected in 1957–58. OEEC countries' rate of production is reported to be considerably lower than a year or two ago, due to Germany's relatively stable potash output. French production showed an 8 per cent rise in 1956–57 and a further 7 per cent increase is expected in 1957–58 and Spanish production increased by 11 per cent. Output is stated to be 85 per cent greater in Spain than in 1949–50.

The trend towards increased production of potassium chloride containing over 45 per cent K_2O was maintained in 1956–57, output of this fertiliser having risen by 8 per cent compared with 1955–56. Output of other potash fertilisers (mainly potash magnesia) has increased by 19 per cent.

IMPORTS AND DEMAND

- **Imports of nitrogenous and phosphate fertilisers from non-OEEC countries in 1956-57 fell.**
- **Potash imports increased by 10 per cent in 1956-57, accounting for 14.5 per cent of total supply.**
- **Total consumption in OEEC countries in 1956-57 was 5.6 per cent compared with 6.5 per cent in 1955-56.**
- **Consumption of nitrogenous fertilisers increased by 8 per cent, potash fertilisers by 6 per cent and phosphate fertilisers by 4 per cent.**
- **Forecast consumption for 1957-58 is 6 per cent more for nitrogenous fertilisers, 3 per cent for potash and 1 per cent for phosphate fertiliser.**

Production capacity of potash fertilisers totalled 3,209,000 tons of K_2O at 1 July 1957, an increase of 7 per cent over capacity at 1 July 1956.

The report states that compared with the previous year both exports and imports of potash fertilisers in 1956–57 increased by about 9 per cent. Imports of high-grade potassium chloride showed the smallest relative increase—6 per cent over 1955–56, and exports of this quality also rose relatively less than exports of potassium chloride containing 20–45 per cent K_2O.

TABLE 6
Potash Consumption in OEEC Countries

	1954–55	1955–56	1956–57(1)	1957–58(2)
In million metric tons of K_2O	2.37	2.53	2.62	2.7
Increase as a percentage over previous year	+3	+7	+4	+3
In kg./ha. of agricultural area (omitting rough grazings) as an average for all OEEC countries	18.6	19.6	20.3	20.9

(1) Preliminary.
(2) Forecast.

More slight slackening in the rate at which potash fertilisers' consumption is rising, is noted. The increase was 4 per cent in 1956–57 compared with the average of 7 per cent for the last five or six years. The increase in 1957–58 is expected to be only 3 per cent. In the main the increased consumption was due to the use of potash in complex fertilisers.

In all but five OEEC countries consumption increased in 1956–57. The largest increases occurred in Austria (63 per cent), Greece (42 per cent) and Spain (29 per cent). There was a noticeable decline in consumption in the Netherlands (—8 per cent) and Switzerland (—9 per cent).

Chemical Price Index Shows Slight Drop

BOARD OF TRADE wholesale price index for January shows a slight drop for chemical and allied products. Provisional January figure, at 144.2, is 0.3 below December but 2.1 higher than in January a year ago. Sulphuric acid and imported crude sulphur for acid making showed marked declines in January compared with December. (The index is based on 30 June 1949 = 100.) The following are figures for individual chemical products.

Product	Jan. 1957	Dec. 1957	Jan. 1958
Dyes & dyestuffs	143.2	143.2	143.1
Disinfectants	128.1	126.5	126.5
Insecticides, weedkillers & fungicides	128.0	128.0	135.5
Synthetic resins & plastics materials	121.3	121.2	124.1
General chemicals	162.7 *	164.1	161.7
Benzole, pure, BSS 136:1950	191.4	191.4	217.1
Caustic soda liquor, 100 per cent TW	168.6 *	168.6	157.6
Soda ash, light (d/d) ...	174.5 *	174.5	164.5
Soda ash, light, f.o.r. wks.	185.7 *	185.7	173.4
Sulphuric acid, BOV ...	164.7	177.2	173.7
Sulphuric acid, ROV, 94/95 per cent	179.6	190.8	181.8
Drugs & pharmaceuticals ...	106.6	106.6	102.9
Explosives (private sector) ...	153.2 *	153.2	154.0
Soap	129.8 *	129.8	124.2
Synthetic detergents ...	121.1	121.1	116.1
Ethyl alcohol, industrial, BS 507–1933	214.4	214.4	156.7
Goods Wholly or Partly Imported			
Carbon black	133.4	133.4	131.8
Fertilisers	200.9	201.1	200.9
Pyrites, c.i.f. UK ports ...	144.4	159.5	175.8
Sulphur, crude (for acid making) c.i.f.	190.1	153.0	136.5

* Provisional

New HQ for Tropical Products Institute

Scientific Staff to be Doubled and Work Expanded

ALL the sections of the Tropical Products Institute (formerly the Colonial Products Laboratory) have now been moved from the Imperial Institute to the new headquarters at 56-62 Gray's Inn Road, London WC2. The new building, erected for office accommodation and converted after purchase for laboratory purposes, will be officially opened by the Duke of Edinburgh on 6 May.

With the change of title and address, the Institute is also adding to its staff and undertaking work of a more fundamental nature than previously. It will also in future cover the renewable resources of the Commonwealth territories as well as their fixed and dwindling natural resources. For instance, aspects of the application of solar energy are to be studied.

Scientific staff at present totals 37; this number is to be increased gradually until by the middle of 1960 it is about doubled. New units are being formed and two of the six existing sections are to be divided. The sections are: 1, essential oils, gums, etc.; 2, oils and oil seeds, starches and feeding-stuffs (to be divided into two sections); 3, fibres, paper-making materials, seaweeds and other cellulose products (a separate section to be created for pulp and paper); 4, insecticides of vegetable origin; 5, fruit and fruit products; 6, animal by-products and tanning materials.

Laboratory Design

Because the new laboratories were not built as such, a number of problems had to be overcome. All services are housed in the basement and are brought up direct through specially-made ducts to each floor level. As ceiling height was below 9 ft. 6 in., ventilation ducts have been provided in all laboratories.

Before conversion of the building, a number of recently opened laboratories were inspected and the design incorporates the best of what was seen. All electrical points, for instance, are raised above bench level to prevent interference in case of spillage or a broken water pipe. All sink traps are in Pyrex glassware, with hot water pipes in lead and cold water services in polythene.

A number of new units have been set up and among them is a well-equipped physical chemistry section. Apparatus here includes spectrographic equipment, the Cambridge Univector recording polarograph, which can be adapted for organic and inorganic determinations, and the Stanton ultramatic balance. There is a separate section for emission spectroscopy.

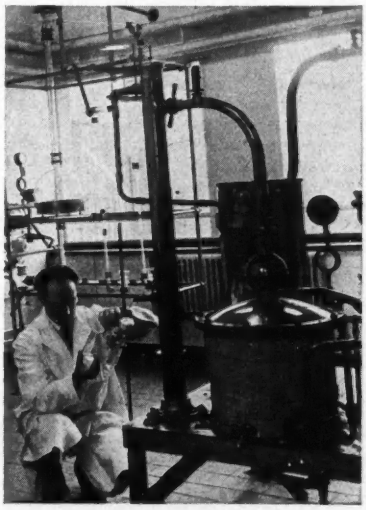
Other units cover microscopy, paper chromatography, counter current techniques, etc. There is still space for further development and new sections planned include physics and engineering.

In the pulp and paper section are Dr. P. C. Spensley, scientific secretary, left, and A. Chittenden, senior experimental officer

The Institute's large reference library with 150,000 items and which is open to the public, has been moved to the new headquarters.

At present the TPI handles between 800 and 1,000 enquiries a year; about 80 of them call for major investigations. Dr. R. A. E. Galley, director, who showed visitors round the laboratories on Monday this week, said the Institute was a form of consulting laboratory to the colonial territories. Work was carried out without fee for the various territories; but fees, on a low scale, were charged for investigations carried out for firms in this country and overseas. In many cases this charge is only nominal, for many industrial concerns help the TPI in the evaluation of the commercial possibilities of new products.

The Institute's work not only helps Commonwealth producers improve the quality of their materials, but has also led to valuable new uses for what have been considered waste products. For instance, Glaxo Laboratories now use as a base for all their cortisone, hecogenin, a waste by-product of the African sisal industry.



W. Matthews, senior experimental officer in the pilot stills laboratory, collects an essential oil sample

Initiative for this came from Dr. P. C. Spensley, the Institute's scientific secretary, who before joining the TPI carried out experimental work with the Medical Research Council.

It is hoped that with the expansion of the Institute's work more will be done to help find new uses for waste products of other processes. For instance, the pulp and paper department, equipped with its own pilot plant scale paper-making equipment and described as one of the best of its kind in Europe, is now working on a project for British Guiana designed to evaluate the properties of paper made from rice straw. So far a good quality paper has been produced; pulp yield is low but with a plentiful supply of the raw material this need not be a major consideration.

Of the major projects now being undertaken, workers are seeking to establish the constituents of pyrethrum and the effects they have on one another. This work is being financed by the Kenya Pyrethrum Board and will it is hoped lead to the breeding of better strains. This programme may eventually involve the use of radioactive carbons.

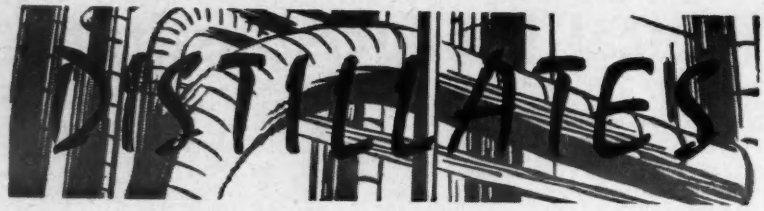
In the essential oils section, it was pointed out that the use of vapour phase chromatography for the separation of various fractions of essential oils had greatly speeded up the pace of this work.

During the summer, vacation courses are to be held in the conference room for Commonwealth students studying in the UK. These courses will cover all aspects of the work of the laboratories and will include lectures and practical work.

Semi-conductors Symposium in Birmingham

A ONE-DAY symposium on 'Metallurgical aspects of semi-conductors', organised by the Institute of Metals, will be held at the College of Technology, Gosta Green, Birmingham, on 25 February. A number of short papers will be presented but copies will not be available before the meeting. Tickets will not be required for this meeting and visitors are welcome.

An exhibition is being arranged at the college by the Royal Radar Establishment, Great Malvern. This will be open on 25 February and also on the evening of 24 February.



★ DR. R. A. E. GALLEY, director, and his colleagues at the Tropical Products Institute must be congratulated for their successful conversion of what was to have been a new office building to laboratory use. Their new Gray's Inn Road headquarters are a great improvement on the cramped space they occupied at the top of the Imperial Institute building.

Among the items that particularly impressed me on my visit this week were the two small laboratories specially included for the use of the senior staff. So often the heads of research establishments become bogged down by paper work that they get out of touch with their practical work. One of these laboratories is for Dr. Galley's personal use; he will, of course, have a personal assistant who will handle much of the day-to-day work.

While he intends to tackle a variety of problems, he is particularly interested in insecticides and intends to handle some of the institute's work on pyrethrins. Another of the TPI laboratories is currently working on a major project financed by the Kenya Pyrethrum Board.

★ A BRIGHT future for tantalum as a result of the sharply increasing use of solid electrolyte capacitors throughout the world, is forecast by Dr. Robert S. Aries, consulting engineer of Stamford, Conn. Recently returned from a trip through West Europe, where he surveyed chemical and electronic installations, he says that production of solid electrolyte capacitors totalled 350,000 in 1956 and about 800,000 in 1957; he estimates that output will total 2,000,000 this year, a figure that will be doubled in 1959.

Solid electrolyte capacitors cannot leak, nor corrode and thus preserve their capacitance for very long periods. They are useful in the wide range of 80°C to plus 125°C. Small in size and well suited to miniaturisation, their development was made possible by the use of very pure tantalum and the technique of forming the very thin oxide layer, which provides the dielectric.

★ IN stating that current requirements of phosphatic fertilisers were 170,000 tons of P_2O_5 (CHEMICAL AGE, 11 January, p. 115), our Indian correspondent was assuming that nitrogen is used in combination with P_2O_5 in the ratio of $N:P_2O_5$: : 1: 2, in accordance with practice in other countries. On this admittedly theoretical basis, India's requirements would be of the order of 1,740,000 tons in 1965-66. At present the ratio of consumption of $N:P_2O_5$ is 8 : 1.

Comparing that figure with the small quantity of 90,000 tons of superphosphate (15,000 tons of P_2O_5) produced in 1956 and 165,000 tons of superphosphate (27,500 tons P_2O_5) produced in 1957, it is clear that the scope for the production and application of phosphatic fertiliser in India is immense. The 80 per cent increase in P_2O_5 production in 1957 over 1956 is evidence of the importance of this material.

The figure of 300 tons of P_2O_5 imported into India in 1956-57 and quoted by our correspondent is an FAO figure and cannot be taken as an index either of the needs or consumption of phosphatic fertilisers in India. While imports of single superphosphate are banned, some triple superphosphate imported might be intended for use not as fertiliser, but for clarification of cane juice. Imports of P_2O_5 might also include some ammonium and nitrophosphate. Few would argue that India has a vast potential market for fertilisers, but whether it will grow as rapidly as our Indian correspondent suggests, must depend on a number of factors, mostly non-technical.

★ I WAS interested to learn this week that, doubtless in preparation for the opening up of free trade in Europe, Dow Chemical Co's overseas sales offices and subsidiaries in Europe are being linked by a new radio circuit with headquarters and plant locations in the US. The circuit has been leased from RCA Communications and Radio-Suisse and provides a link between New York and Zurich.

The radio channel is a Dow private line that operates 24 hours a day. An existing teletype system serving Dow in the US is hooked in New York to the new channel to Zurich which in turn acts as a relay station for Dow offices in Zurich, Rotterdam, and Stockholm and Nederlandsche Dow Maatschappij, a Dutch subsidiary in Rotterdam.

The opening of the radio circuit is the beginning of a planned, fully integrated and privately operated network connecting Dow, Dow Chemical International Ltd., and Dow Chemical Inter-American Ltd., throughout the world.

★ A REQUEST to restrict the use of washing powders and detergents containing fluorescent whitening agent to bleached fabrics was rejected recently by representatives of one of the major manufacturers. The request came from the Furnishing Fabrics Federation, which was told that it was the producers' policy in recent years to manufacture for the broadest possible market. The possible effect of fluorescent whitening agent on certain coloured goods, in particular those dyed in pastel shades, was admitted.

It was felt that the fluorescent whitening agents enabled a standard of whiteness to be achieved which was not possible by any other means. In addition, similar agents were used extensively in the finishing of sheets, towels, pillow cases, etc., and unless they were also used in washing products, there would be an undesirable loss of whiteness as a result of washing.

★ DEVELOPMENT of Canada's chemical industry, even in a field accustomed to fast expansion, has been rapid. Its major problem this year is the growth of markets, both domestic and foreign. Elsewhere in this issue, Mr. H. Greville Smith, president of Canadian Industries Ltd., and this year's SCI president, reviews prospects for the industry.

Another prominent Canadian executive, Mr. L. D. Smithers, president of Dow Chemical of Canada, states that the period of readjustment undergone in 1957 will continue this year, particularly as many new chemicals are now 'in long supply.' Plants tend to be expanded beyond home needs and depend increasingly on exports to operate at economic levels.

Canada, virtually a newcomer to export markets, is meeting the same difficulty as UK chemical manufacturers; foreign countries are becoming more self-sufficient. Canadian producers also anticipate growing foreign competition in their home market.

But, because chemicals are being used in relatively higher volumes, Mr. Smithers believes that 1958 will be a satisfactory year for those who operate efficiently and sell aggressively.

★ THE Chancellor was asked in the House last week if a supplementary grant for universities would be considered, as the sum made available in the quinquennial review 'is insufficient to allow them to expand their work properly'. Mr. J. E. S. Simon, the Financial Secretary, said that it would not. The quinquennial settlement provides for grants which are 8 per cent higher in the current academic year than in 1956–7 and which rise by a further 30 per cent over the next four years. Universities are also receiving supplementary grants in respect of the cost of the salary award last August.

This increase, however, does not meet the needs of those universities which, to cope with an increasing influx of students and the need to enlarge certain departments, should spend in the current academic year more than is allowed by the initial increase of 8 per cent in their grants.

Alembic

Plutonium Impurities Assay By Diffusion Technique

Nitrogen, Chlorine and Sulphur

WORK carried out at the UK AEA laboratories at Windscale for the determination in plutonium of certain non-metallic impurities which can be liberated as volatile compounds, utilising the Conway diffusion method, was dealt with by Mr. J. K. Foreman at a meeting of the Society of Analytical Chemistry's Microchemistry group held on 7 February at the Chemical Society, Burlington House, Piccadilly, London W1.

Some general properties of the diffusion technique were first described, with particular emphasis upon the rate of absorption of the volatile compound and the generally predictable manner in which this varies with such parameters as the dimensions of the diffusion unit, the free diffusion space and the volume of solution in the compartment from which the gas is liberated. In the latter case an inverse relationship exists, the form of which depends upon the solubility of the gas in the liberating solution. Since gas solubility is important, the absorption rate may be increased by 'salting-out' the gas from the sample solution.

Important Features

Features of the Conway diffusion technique which favour its use for the analysis of radioactive materials such as plutonium were stated as being:

(1) Compactness, enabling a considerable number of analyses to be performed in a small glove box.

(2) The diffusion unit is a closed system and the spread of radioactive contamination is thereby effectively localised.

(3) Little operator attention is required.

(4) The effect of variables associated with a particular analysis may readily be predetermined by a limited number of experiments and can usually be supported by simple theoretical considerations.

Specific applications described were the determinations of chemically combined nitrogen, chlorine and sulphur in plutonium. Imperial Chemical Industries Ltd. had in each instance carried out useful preliminary work using uranium as a substitute for plutonium.

In the case of nitrogen the metal was dissolved in the minimum volume of hydrochloric acid in the outer compartment of the Conway cell and nitrogen liberated as ammonia by addition of sodium hydroxide. The concentration of this reagent was chosen as 6N to increase the absorption rate by minimising the total volume of sample solution and utilising the 'salting-out' effect of strong salt solutions. The ammonia was collected in 1 ml. of 0·1N hydrochloric acid in the centre chamber of the unit. The determination of nitrogen in the diffusate was initially carried out absorptiometrically using the blue coloration given by ammonia with sodium phenate and sodium hypochlorite using a manganous salt as catalyst. While this method is sensitive and a limit of detection of about 1 μg. nitrogen can be achieved, the procedure has the disadvantage that the diffusate must be removed from the Conway unit and also the method involves the use of several reagents, of which the sodium phenate in particular is unstable. This approach was therefore abandoned in favour of a direct titration of the excess of acid in the diffusate with standard alkali. The ammonia was allowed to diffuse into 0.01N sodium sulphuric acid and the excess titrated with 0.01N sodium hydroxide, using methyl red as indicator. The indicator was incorporated in the sulphuric acid stock solution in order to render constant the 'blank' titration due to the indicator. Sodium hydroxide gave a sharper end-point than sodium carbonate, and this outweighed its inferior keeping qualities. The sharpness of the end-point change improved as the volume of solution titrated was decreased, and consequently the smaller No. 2 Conway units were used in preference to the standard No. 1 unit. With the No. 2 unit a volume of 0.1 ml. of absorbing acid completely covers the surface of the centre compartment. Using this procedure a precise back titration of 1 μg. of nitrogen may be obtained.

Sodium Hydroxide

Using sodium hydroxide to liberate ammonia from solutions containing plutonium (III) and plutonium (IV) a precipitate of plutonium hydroxide forms. This was shown not to occlude ammonia and this method is preferable to preoxidation to plutonium (VI) to give the soluble carbonate complex when sodium carbonate is used to liberate the ammonia, since a marked saving in both pretreatment time and diffusion time results

In the original work solutions of ammonia salts were used for standard additions of nitrogen, but a more rigid proof of the method was obtained by preparing pure plutonium nitride (Brown, Ockenden and Welch, *J. Chem. Soc.*, 1955, 4196).

To determine combined chlorine this was liberated as chlorine, using a sulphuric acid/potassium permanganate oxidising mixture and absorbing it in sodium hydroxide. Any hypochlorite was converted to chloride by addition of a slight excess of hydrogen peroxide. The determination of chloride was carried out potentiometrically using a silver/silver amalgam electrode pair.

It was found impracticable to attack plutonium metal directly with the oxidising mixture, since complete dissolution of the metal could not be ensured. The plutonium was therefore dissolved in the outer compartment of the Conway cell using 0.5 ml. 5N sulphuric acid and 1.5 ml. of the oxidising mixture (three parts 6 per cent potassium permanganate and 1 part concentrated sulphuric acid) added subsequently. As normally prepared the oxidising mixture has a high chlorine 'blank' and the solutions must be mixed in a bath of solid carbon dioxide and warmed to room temperature under vacuum.

The potentiometric titration of microgram amounts of chlorine works most satisfactorily in small volumes. Larger volumes, i.e., 0.5 ml. can be conveniently titrated in a platinum fluorimeter capsule, a change in potential of 40-50 mv being obtained at the end-point. The limit of detection of the method is about 1 μg. of chlorine.

For the determination of combined sulphur the plutonium was dissolved in 0.5N hydrochloric acid in the outer compartment and the hydrogen sulphide so liberated absorbed in a suitable medium. Initially a solution of zinc acetate was used, the determination being completed absorptiometrically, using the 'Lauth's Violet' formed on addition of *p*-phenylenediamine and ferric chloride. At first low recoveries of added sulphur were obtained, due to the incomplete absorption; a visible film on the surface of the zinc acetate solution was formed. Reducing the surface tension by adding alcohol or Lissapol (which do not affect the colorimetric finish) to the zinc acetate solution gave improved, but not complete, recoveries. In view of the limited time available a simpler, less precise, method was devised in which the hydrogen sulphide diffused on to filter paper impregnated with lead acetate, the stain formed being compared visually with standard stains. For either approach, sulphur-free water, obtained in this instance by passage through a column of the anion exchange resin Amberlite IR(A) 400, must be used.

Dr. Hamence, SAC President, Opens Discussion

The president of the Society for Analytical Chemistry, Dr. J. H. Hamence, opened the discussion on Mr. Foreman's paper. He asked if it was not advisable when determining traces of sulphur to work in an inert atmosphere. This was an old problem with sulphur standards. Unless oxygen was out of the water sulphur disappeared.

Mr. Foreman said that his work had not been carried out in an atmosphere of nitrogen. Boiled-out distilled water was used and also ion-exchange water.

The lecturer was asked by a member of the audience about the clarity of the end point of a titration. With screened methyl red, the end point was not clear owing to lingering of fluid in angle of the point of burette. He wished to know whether the lecturer found it necessary to use a stirrer. Did he look at the Conway unit at eye-level and not at the apparatus placed on the

bench. Replying, Mr. Foreman said he did stir roughly with a glass rod and he viewed at eye-level.

In answer to an enquiry on the value of the Conway technique and boron analysis, Mr. Foreman said he had no experience of borate.

Another member of the audience said that he had investigated the Conway technique for boron but had had to abandon the work because of the practical difficulties involved.

Mr. R. Powell said that over 50 ml. of methyl alcohol was required for determination of borate and this alone he thought would rule out the use of the Conway diffusion method.

Another point raised was the cleaning of the Conway cells, particularly when they were to be used in determining nitrogen as ammonia. Chromic acid had been found to linger and with the use of detergent, creeping was exhibited. Also what was the method of sealing Mr. Foreman used?

Mr. Foreman said they cleaned the Conway unit by washing with hydrochloric acid. The units were then left in 50 per cent sulphuric acid, wiped with tissue and dried slowly under radiant heat. For sealing the units, paraffin wax (40 gm.) dissolved in liquid paraffin had been used. Vaseline had also proved suitable.

Dr. Wilson, Imperial Chemical Industries Ltd., said that he had found soap and water best for cleaning the units. No tendency to creep had been noticed. Another member agreed with the use of soap and water and said he used cotton wool to wipe the units.

Yet another speaker said he had found fuming nitric acid best, followed by washing with water. The units were then left to drain.

Mr. Foreman was asked what was the smallest amount of chlorine that could be estimated. He said 0.1 microgram in ½ ml. liquid but added that this was found to be 100 per cent inaccurate.

Dr. J. Haslam asked how one could assess the amount of solvent required. For this a standard EMF curve could be plotted Mr. Foreman said.

Lastly, Mr. Foreman was asked about the precipitation of sodium hydroxide with nitrogen. Did complexes form? Was amino-carboxylic acid formed? Mr. Foreman said that the determinations which formed the basis of his paper were carried out in 1942. As hydroxide did not include ammonia, they were quite happy with its use.

New Non-Toxic Plasticiser by Coalite and Albright

A NEW plasticiser, Coalite NTP, is announced jointly by Coalite and Chemical Products Ltd. and Albright and Wilson (Mfg.) Ltd. It is the outcome of an intensive programme of research carried out by these companies into the toxic properties of certain organic phosphorus compounds in which special emphasis has been placed on the search for the neurotoxic properties possessed by a few of them.

Coalite NTP, for which no chemical description has yet been announced, is stated by the manufacturers to be free from any undesirable toxic properties and to confer a very high degree of flame resistance. Such a plasticiser is therefore o interest to manufacturers who wish to take advantage of the obvious merits of phosphate plasticisers — abrasion resistance, flame resistance, quick processing—in applications where a safe product is essential.

Coalite NTP is a water-white, odourless liquid with a flash point of 271°C. It is miscible in all proportions with ether, alcohol, acetone, benzene, toluene, amyl acetate, carbon tetrachloride, trichlorethylene and carbon disulphide. Good compatibility is claimed with alkyds, styrene, butadiene, cellulose acetate, nitrate, chlorinated rubber, ethyl cellulose, polystyrene, polyvinyl butyral, p.v.c., p.v.c.a., polyvinylidene chloride, phenol and urea formaldehydes and neoprene-type material.

Moderate compatibility is claimed with cellulose acetate butyrate, methyl methacrylate and polyvinyl acetate and limited compatibility with shellac and cellulose acetate.

The manufacturers claim that Coalite NTP is suitable for use as a plasticiser for plastics employed in food wrapping, for toys, upholstery and clothing. It can also be used as a hydraulic fluid either by itself or mixed with other hydraulic fluid oils.

A summary of the toxicological evidence, also samples and data sheets can be obtained from Albright and Wilson (Mfg.) Ltd., who are selling agents.

Firm With Good Accident-Free Record Fined

ORRS ZINC WHITE LTD. were fined £50 at the Widnes Magistrates' Court last week for an offence against the Factories Act. Mr. S. Grant, Inspector of Factories, said there were two large vats at the works and there was a platform to give access to some wooden bungs which controlled the flow of liquor. There was a hole in the cover of one vat and the level of the liquor was a foot below that opening. There was no guard rail to prevent the process men over-balancing or slipping, as happened in this case. One man sustained a severe scald which kept him off work for several months.

Mr. Frank Hopkins said he was responsible for the safety arrangements at the firm. The covers over the vats were not erected as platforms. Changes had been made because they wanted to conserve steam. The lid in question fitted flush with the vat cover and was a perfect fit. Mr. H. Davies, for the firm, said his client had not thought it possible for such an accident to occur.

Orrs Zinc White Ltd. had a remarkably good accident record, namely 1½ hours per 100,000 working hours. That put them in the top 50 of chemical factories all over the country. In the last year alone £2,000 was spent on accident prevention methods.

Fatty Alcohols By Catalytic Hydrogenation

IT IS announced that long chain fatty alcohols are now being produced by Procter and Gamble in Sacramento, US, by catalytic hydrogenation with 'considerable savings'.

The continuous process developed by Procter and Gamble and now in use at their Sacramento and Kansas City plants, reduces esters of fatty acids. Information has been released which gives details of the process. Coco-nut oil or tallow is converted to methyl esters, producing by-product glycerol. The fatty esters are distilled (to get rid of potential catalyst poisons) and then passed into a series of laminated pre-stressed reactors. Hydrogenation is effected at 3,000 to 4,000 p.s.i. according to the esters' purity using an excess of hydrogen. The catalyst used is a selective copper-chromium (Adkins type). The hydrogen is produced in a package medium-pressure gas plant using butane, steam and a nickel catalyst.

During the reduction process, methanol splits off, fatty alcohols are formed and unsaturated material is hydrogenated. The fatty alcohol mixture is fractionated and all the process reactants are recycled.

Recycling is accomplished by passing the whole reaction mixture through a heat exchanger, then to a gravity separator where the catalyst is drawn off and returned to the reduction vessels. Additional catalyst is added to the recycled material to restore it to full potency.

From the gravity separator the product passes to the fractionation units. The fraction containing C_8 to C_{10} alcohols is distilled for use in plasticisers. The remainder is used in Procter and Gamble's detergent processing. Hydrogen and methanol vapour pass to a cooler from the gravity separator. The condensed methanol is recycled, going to the ester-formation unit. The hydrogen gas is recompressed (by a single-stage compressor), passes through the mixture-cooling heat exchanger, finally passing to the reactors. This gas is made up with further gas and then travels via a direct-fired heater to the reactors.

Imperial College Postgraduate Courses

POSTGRADUATE courses for 1958–59 at the Imperial College of Science and Technology, London SW7, are described in a booklet recently published by the college, price 1s. These courses provide an opportunity for students to further their knowledge in a particular specialised field. Many have been accepted by the Department of Scientific and Industrial Research for the tenure of advanced course studentships.

In chemical engineering it is possible to take either a one-year course for the Diploma of Imperial College or a two-year course for the M.Sc. degree. The first year of the M.Sc. course is the same as the DIC course and the second year consists of research.

Courses are also available in chemical technology, leading again to the DIC after one year. A one-year DIC course in nuclear technology (chemical) is being arranged and details will be announced later.

NEW TECHNICAL COLLEGE HAS A MILE OF GLASS PIPING

OVER a mile of glass piping has been installed by QVF Ltd., Duke Street, Fenton, Stoke-on-Trent, in the new 11-floor technical college at Nottingham. Described as the world's largest installation of visible flow glass waste lines and sink traps, it is now nearing completion.

The entire installation is completely sealed and has no open traps. Beginning on the seventh floor of the building, it forms one continuous system to the outside drains. The main stacks consist of lines of four-inch bore lines, with three-inch, two-inch and one-and-a-half inch bore lines at intermediate stages. The whole installation is fitted within ducts through the walls and the horizontal lines are carried in the floor-ceiling cavities.

There are 248 sink units, each with its own sink trap constructed of glass. Any build-up of solids can be detected at once, the trap can be opened by hand and cleared. Several systems are used to trap the effluent from the sinks, employing either individual traps for each sink or traps serving several sinks simultaneously.

The choice of materials for this type of work is limited to those having high resistance to chemical attack and corrosion, and QVF believe that borosilicate glass provides the most effective answer.

It is light in weight and does not need continuous support, additions and subtractions to the installation can be made easily. Internal friction is negligible and no scale forms. The whole system can be cleaned by forcing rubber balls through it under water pressure.

An important aspect of the system is the ease with which any blockage in the pipelines can be located. It is only necessary to look to see where the trouble is.

The borosilicate glass has been developed primarily for handling chemicals and has a high degree of chemical resistivity. It will, it is claimed, withstand the thermal shock of flushing alternatively with boiling liquids and ice-cold water.

Main contractors for the Nottingham technical college were F. G. Minter, 4 Buckingham Gate, London, SW1. Installation of the visible flow pipelines was by QVF's own plumbers. As soon as the seventh floor installation was completed, students were able to start working there while the remaining floors were completed. No floor had to suspend operations while work was carried out on the adjacent floor.

Nine of the 11 floors of the Nottingham technical college will soon have been equipped with visible flow waste-lines.

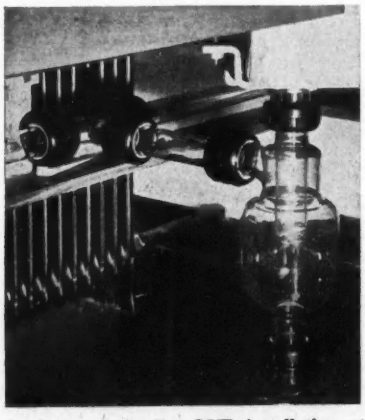
Similar systems have already been installed by QVF at Acton and Harrow technical colleges and in the near future work will begin at Derby and Mansfield technical colleges and at a later date at Nottingham University.

Cost of the present installation is about £10,000. It is believed that this type of installation costs about 50 to 60 per cent more than conventional plumbing to install. It will, however, last indefinitely.

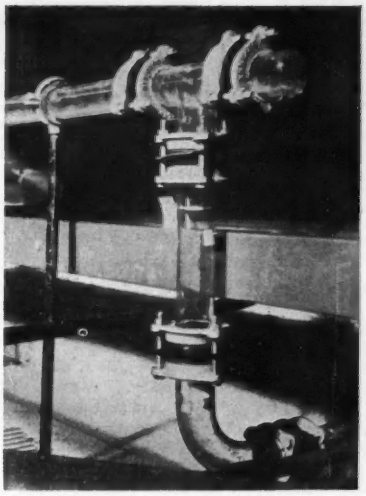
Speaking of QVF's work in the chemical engineering field, Mr. J. G. Window, sales director, said that his company could beat US companies both on price and delivery. They had supplied in Canada an installation costing £10,000. This, he said, was worth $50,000 to the company concerned.

QVF equipment, they had learned recently, had been used in ZETA.

In Germany, the company's subsidiary accounted for 80 per cent of the orders for this type of equipment.



A sink trap in the QVF installation at Nottingham. The cap at the bottom can be opened to clean the unit and to remove any solids which might enter



The horizontal pipeline in the aperture between floor and ceiling. By attaching a new glass pipe in place of the buttress cap the system can be extended to serve other sections

Electron Bombardment Technique for High Purity Metals

To obtain high purity in metals such as titanium, niobium and tantalum a technique employing electron bombardment melting has been developed by the Temescal Metallurgical Co., US. The process will be exploited jointly by Stauffer Chemicals, Mallory-Sharon and Temescal Metallurgical.

A vacuum furnace is used in which an ingot of impure metal can be lowered vertically at a controlled rate. An electron gun, serving as the cathode bombards the ingot (the anode) with electrons, heating it to the melting point. Molten metal drops into a water-cooled crucible below, which is gradually lowered as the solid metal builds up. Carbon, hydrogen and oxygen are removed rapidly from the furnace, generally as carbon monoxide, the metal oxide or carbide, or a similar compound. Impurities, which will form compounds having a partial pressure of at least 10^{-5} atmosphere in the melt, are stated to be removed with ease.

According to Temescal Metallurgical electron bombardment is economically competitive. For the purification of niobium 3 to 4 kW./hour per lb. is required; tantalum takes about 6 to 8 kW./hour per lb. Solid state sintering of tantalum, on the other hand, uses 500 kW./hour per lb. Another important finding is that tantalum and molybdenum of higher orders of purity than ever previously known, have been produced, while ductile niobium, previously made by solid state sintering, is said to be a commercial reality.

At present Temescal's pilot-plant consists of a four-foot diameter vacuum furnace and a 32-inch diffusion pump. The electron gun is formed by a single ring of 0.1 inch tungsten wire around the periphery of the furnace. The electron beam is focused on the ingot by means of a static field. Power input is 12 kW. Several thousand pounds of ductile niobium are being produced at the plant each month.

Investigations are now being made to extend the technique to direct melting of unconsolidated sponge. A spatter shield is made the anode and the static field is distorted so that the electron beam carries through a right angle to impinge on the sponge. Molten metal from the sponge spatters onto the shield and then drops into the crucible.

Temescal plan to manufacture and sell the furnaces of their design and to grant non-exclusive licences on the process itself for research on a royalty-free basis. Later a programme of licensing for commercial production will be undertaken.

Scientific Instrument Team for Canada

The Scientific Instrument Manufacturers' Association is arranging a Canadian tour for senior executives of leading instrument manufacturers. This follows the visit of the Canadian Trade Mission to this country last December. The eight-man team, has the active support of the Dollar Exports Council.

NEW HERBICIDE DESCRIBED BY ICI RESEARCH TEAM

DURING investigations into the herbicidal properties of a series of quaternary ammonium compounds at Imperial Chemical Industries' Jealott's Hill Research Station, Bracknell, Berks, one compound was found to exhibit exceptional activity. This compound was 1:1′-ethylene-2:2′-dipyridylium dibromide (X), a well defined crystalline product. It is described by R. C. Brian, R. F. Homer and J. Stubbs of Jealott's Hill Research Station and R. L. Jones of ICI's pharmaceuticals division, Alderly Park, Cheshire, in *Nature*, 1958, **181**, 446.

1:1′-Ethylene-2:2′-dipyridylium dibromide is readily soluble to the extent of 70 g. in 100 c.c. of water at 20°C and is stable in acid or neutral solution. In alkaline solution coloured complexes occur.

Investigations showed that aqueous solutions of X with added wetter (0.3 per cent Agral LN) applied as foliage sprays at the rate of 100 gal./acre gave complete kill of wheat, sugar beet, white mustard, marigold, red clover and cleavers (*Galium* aparine) at dosages down to ½ lb./acre. At ¼ lb./acre, there was 100 per cent kill of marigold, almost complete kill of mustard and serious damage to the remaining species. Even at ¼ lb./acre X caused serious damage to all species other than cleavers. In the absence of wetter, X was equally effective, though it was less damaging to wheat and clover. Similar results were obtained with low volume (20 gal./acre) application. The action of the the chemical was very rapid.

Proof was obtained of the uptake and translocation through the aerial parts of broad beans and oats. It was also observed that X was rapidly and completely absorbed by the soil but that root uptake of the chemical in culture solution could occur.

Highly Active

At ¼ to ½ lb./acre X was found to be highly active against species resistant to 2, 4-D and MCPA—chickweed, groundsel, mayweed and speedwell. Russian thistle was also highly susceptible at ¼ lb./acre.

Field trials were then carried out. Excellent potato haulm destruction was given by X at 1 to 2 lb./acre. Kill of common annual weeds, including fat hen, redshank, annual nettle, chickweed and black nightshade by X was superior to that given by either sulphuric acid or sodium arsenite.

Indications that X was of value of a pre-harvest desiccant of red clover seed crops were confirmed in a more detailed trial last year when it was shown that 1 to 2 lb./acre desiccated the crop at least as well as sulphuric acid (15 per cent B.O.V.) applied at 100 gal./acre.

Damage in the field by X to cereals was less than greenhouse trials had suggested. Oats proved resistant up to 2 lb./acre. Wheat, maize and barley showed increasing damage in that order. Sprays of up to 1 lb./acre at the 2 to 3 leaf stage did not reduce grain yields but later treatments affected the yields. At this same dosage, most species of broad leaved annuals, except corn poppy, corn marigold and parsley piert were adequately controlled. Other resistant strains were knotgrass, black bindweed, redshank, charlock, runch, cut-leaved nettle, many-sided goosefoot, and scarlet hen. Good kill of top growth of such broad leaved perennials as dock, creeping thistle, mint, field bindweed, ox-tongue picris and ground elder, and for a range of grass species was obtained. Basal regeneration, however, nullified treatment. Similar effects with X at 2 to 5 lb./acre were obtained with various brushwood species including bramble, briar, hawthorn, elder and elm.

Research is continuing to define the full potential of this herbicide. Main applications are likely to be potato haulm destruction, crop desiccation and non-selective weed-killing. 1:1′-Ethylene-2:2′-dipyridylium dibromide is the subject of British Patent Specification No. 785,732.

ILO Chemical Industries Committee Opens Fifth Session at Geneva

Fifth session of the chemical industries committee of the International Labour Organisation opened at ILO headquarters in Geneva on 10 February under the chairmanship of Maximilian Sauerborn, representative of the Federal Republic of Germany on the ILO's Governing Body.

Luis Alvarado, assistant director-general of ILO, told delegates that the chemical industries had been in the forefront of the industrial expansion of the last few years. He added that the chemical industries had developed at such a rate that hardly any area of human activity had been untouched.

Speaking of the advent of atomic energy, Mr. Alvarado said that, in addition to constituting a new source of energy, the nuclear industry was playing a part in the upsurge of chemical activity.

In his opening address, the chairman stated that the deliberations of the ILO's various industrial committees formed a welcome complement at a more specialised level to the work of the International Labour Conference. The present committee, added Mr. Sauerborn, was not occupied exclusively with chemical questions, but also with economic and social problems.

He added that this branch of industry was particularly affected by the two problems of the present day—the peaceful use of nuclear energy and automation. The industry should also concern itself with social problems posed by the employment of even broader strata of the workers on jobs with increased responsibilities.

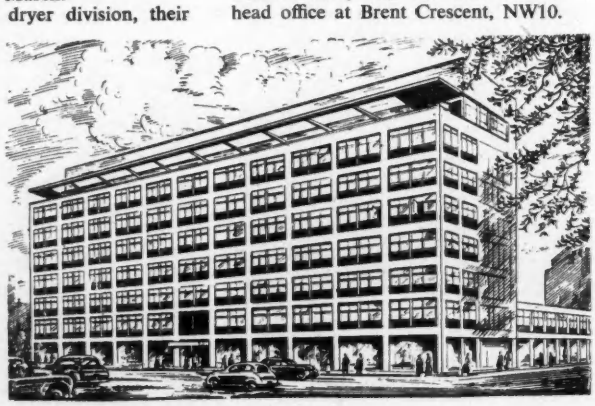
Other speakers at the opening session were Mr. Ernst G. Erdmann, representing the employers' group of the governing body, and S. de Azevedo Pequeno, representing the workers' group.

The 21 member countries of the ILO who are taking part in the conference are represented by tripartite delegations of governments, employers and workers. The USSR has sent an observer delegation. Also taking part as observers are representatives of several governmental and non-governmental international organisations.

Berk Move to New Head Office

SHOWN below is the new head office of F. W. Berk and Co. Ltd., at Portman Square, London W1, telephone Hunter 6688, telegrams, Berk, London, Telex. Occupation of Berk House will be completed by 1 March.

Berk's industrial dryer division, their powder metallurgy division, and micronisers plant department, will also transfer from their present separate offices. The heavy chemicals sales department will remain at Abbey Mill Chemical Works, London E15, and the Schori division head office at Brent Crescent, NW10.



Artist's impression of Berk's new head office

2,800 TONS DDT A YEAR FROM INDIAN PROJECTS

Trial Production at Alwaye

INDIA'S second DDT factory, at Alwaye (Kerala State), has begun trial production. The factory, which will have a capacity of 1,400 tons of technical DDT per year, is expected to attain full production shortly.

At the same time the expansion programme of the Delhi DDT factory, which has been in production for the last two years, is nearing completion. It will then have a capacity of four tons per day—1,400 tons per year.

Production at the Delhi factory has been steadily rising. As against the production of 172 tons in 1955 the factory stepped up its output to 492 tons in 1956. The production during 1957 is estimated to exceed 600 tons of technical DDT, the output in the first six months being 306 tons.

The second unit for doubling the capacity of the Delhi factory, estimated to cost about Rs.21 lakhs (£157,000) has already been installed. The United Nations International Children Emergency Fund (UNICEF), which helped in setting up the factory, is also assisting in the expansion programme by supplying plant and equipment.

US Co-operation

The Alwaye factory, which is being constructed in collaboration with a US company, is expected to cost about Rs.80 lakhs (£600,000). Raw materials for the factory will be obtained from chemical works in the neighbourhood and from the coke ovens of Sindri and the associated steel works.

With the completion of the Alwaye project and the doubling of the capacity of the Delhi factory, the country's current requirements of anti-malarial insecticides will be met from indigenous production. About 2,000 tons of insecticides other than DDT are being produced by private manufacturers. Total requirements are estimated at 5,000 tons per year.

Both the Delhi factory and the Alwaye project are being managed by the Hindustan Insecticides (Private) Ltd., a Government-owned company under the Ministry of Commerce and Industry.

Rubber Industry's Progress.—The progress of India's rubber industry during the year 1957 was reviewed by Mr. J. Luckham, chairman of the Association of Rubber Manufacturers in India, at the annual meeting of the association held at Dunlop House, Calcutta, recently. The industry consumed during the year about 35,000 tons of natural and synthetic rubber, an increase of 11 per cent over the previous year, and 65 per cent over 1952. The high rate of consumption necessitated the import of large quantities of both natural and synthetic rubber (nearly 8,500 tons and 3,200 tons respectively up to the end of October).

Implementation of plans to increase the acreage of South Indian estates was undertaken during the year to step up indigenous production.

A Rubber Manufacturers' Co-operative Research Association is being set up to deal with the problems of the industry.

Mr. Luckham, managing director of Dunlop Rubber Co. (India), Ltd., was re-elected chairman of the association for 1958.

National Research Development Corporation.—During the year ended March 1957, 134 inventions were reported to the corporation for development by 21 research institutions; the National Chemical Laboratory, Poona, contributed 20 inventions, the largest number. One development project is the deionisation of cane juice. This work has been in progress at the National Sugar Institute, Kanpur. Different commercial resins have been tried to determine their suitability for deionisation of cane juice both by direct and reverse deionisation. Bench scale units with 4 in. Perspex columns have been fabricated and erected. A design for a pilot plant has been prepared. Manufacture of the required types of resins in India is proposed to be taken up soon.

India now produces about two million tons of white sugar from sugar cane and about 0.7 million tons of molasses as a by-product. By large scale adoption of the new method it should be possible to obtain an additional output of 0.14 million tons of sugar from the same quantity of sugar cane.

A project to investigate the commercial feasibility of production of copper chlorophyll using indigenous raw materials, namely, stinging nettle (pat. no. 47655) has been instituted at the Shri Ram Institute for Industrial Research, at an estimated cost of Rs.10,000 (£750).

INDIAN NEWSLETTER

- **India's second DDT factory has begun trial production.**
- **Increased consumption of synthetic rubber in India.**
- **Development projects by the National Research Development Corporation include deionisation of cane juice, and copper chlorophyll production.**
- **Production of baker's yeast using cane molasses.**
- **Manufacture of p-nitroacetophenone.**
- **Recent licences granted under the Industries (Development and Regulation) Act.**

Preliminary laboratory experiments with spinach leaves have given encouraging results. A unit for processing of the alcohol extract to the finished product has been designed and is under fabrication.

Processes Licensed.—Indev (Private) Ltd., Bombay, have produced small quantities of pristimerin and dulcitol. These compounds will be marketed shortly.

A plant for the extraction of nicotine sulphate from tobacco waste has been fabricated by Tobacco By-products Ltd., Guntur. The company expects to go into production shortly. Newmac Corporation, Bombay, are putting up a factory at Ahmadabad for the manufacture of Lisasorb, the absorbent for carbon dioxide developed at the Central Fuel Research Institute, Jealgora. The DCM chemical works, Delhi, are installing a pilot plant for the preparation of ethylene dichloride at their works to study the optimum conditions for the manufacture of the material on a large scale.

Development Agreement

A developmental licence agreement has been negotiated with Atul Products Ltd., Atul, according to which the firm will, at their own cost, undertake detailed investigations for the design and fabrication of a large scale plant for production of benzidine—an important dyestuff intermediate—according to a process developed by the Council of Scientific and Industrial Research.

Production of Baker's Yeast.—A method for the production of active dry baker's yeast (ADY) using cane molasses as the raw material has recently been developed at the Central Food Technological Research Institute, Mysore. A slant culture of a strain of baker's yeast (*Saccharomyces cerevisiae*, Hansen *Var*, Ellipsoideus) is used to inoculate aseptically a sterilised medium consisting of molasses (4 per cent), ammonium sulphate or urea (0.1 per cent) and potassium dihydrogen phosphate (0.1 per cent) in two 4-litre flasks. The flasks are kept in a horizontal shaker for aeration for 24 hours. The crop thus obtained is used as the inoculum for a 20-litre culture in a stainless steel tank. Compressed air filtered through cotton is introduced in the tank.

The nutrient solution is prepared from clarified molasses in high concentration and fed to the tank containing water at a very slow rate, so that the sugar concentration in the tank does not exceed 0.5 per cent. Vigorous aeration is maintained throughout the cultivation period of about 24 hours. The yeast is then separated by centrifugation in a stainless steel separator and washed several times till the wash water is colourless. The 10 per cent yeast cream is further concentrated in a basket centrifuge to a moisture content of 60 per cent. The white cake is shredded and dried (5 to 6 hours) in thin layers in a current of cold air. Data for a typical cultivation experiment are as follows: molasses 15 lb., urea 200 g., potassium hydrogen phosphate 200 g., water 40 gal., initial pH 4.5, time of cultivation 22 hours, yield of dry yeast 1,300 g., yield on sugar in molasses 34 per cent.

The bakery industry in India every year

consumes large quantities of yeast—all of which is at present imported. The imported material is expensive.

p-Nitroacetophenone.—On account of its use as an intermediate in the manufacture of chloramphenicol, *p*-nitroacetophenone has assumed commercial importance in recent years. The usual method of preparing *p*-nitroacetophenone involves the use of metallic sodium, potassium or magnesium in the condensation of *p*-nitrobenzoyl chloride with ethyl acetoacetate. An improved process, developed at the Haffkine Institute, Bombay, consists in carrying out the condensation of ethyl acetoacetate with *p*-nitrobenzoyl chloride in the presence of anhydrous caustic alkali; this eliminates the hazards involved and the controlled conditions necessary in the handling of metallic sodium, potassium or magnesium.

Sodium hydroxide flakes (5.6 g.) are added to a mixture of ethyl acetoacetate (27.3 g.) and benzene (250 ml.) and the mixture stirred at room temperature (28–30 °C) for about 16 hours. *p*-Nitrobenzoyl chloride (26 g.) in benzene (50 ml.) is then added slowly under mechanical stirring at 45–50 °C. Stirring is continued for another 4 hours and the mixture allowed to stand for 16 hours at room temperature. The mixture is filtered to separate inorganic material and the filtrate distilled under reduced pressure on a boiling water bath until no more of the distillate is collected. The oily residue (ethyl-α-*p*-nitrobenzoylacetoacetate), left in the distillation flask, is cooled and stirred with aqueous sodium hydroxide (10 per cent, 250 ml.) until most of it dissolves. The clear alkaline solution obtained after filtration is acidified with sulphuric acid and cooled. The solid (ethyl-*p*-nitrobenzoyl acetate) thus obtained is filtered, dried and refluxed for 4 hours with concentrated sulphuric acid (37 ml.) and water (185 ml.). The mixture is cooled, diluted with water and the solid that separates is collected, washed and stirred with a hot solution of sodium bicarbonate (10 g.) in water (80 ml.). The mixture on cooling gives *p*-nitroacetophenone which crystallises from alcohol as yellow needles, having a melting point of 80 °C, yield 16.75 g. (72 per cent of theoretical on *p*-nitrobenzoyl chloride taken).

New Licenses.—A licence under the Industries (Development and Regulation) Act has been granted to Geoffery Manners and Co., Private Ltd., Bombay, for the erection of a plant to manufacture 20 tons of phenacetin a year. Sandoz Products Ltd., Bombay, have been licensed to make the following products per month: Calcium gluconate, 3,000 kg.; ferrous gluconate 850 kg. and optical bleaching agent, 2,750 kg. Alta Laboratories Ltd., Bombay, have been authorised to instal plants for the manufacture of salicylic acid, 20 tons, aspirin 8 tons, methyl salicylate, 2 tons; sodium salicylate 10 tons and salicylamide 2 tons per month.

Canada's Chemical Production was up by 5 Per Cent Last Year

REVIEWING business activity in Canada in 1957, H. Greville Smith, president of the Canadian Industries, Ltd., has stated that despite some slackening in the pace the value of output of chemicals and allied products in Canada in 1957 rose by approximately 5 per cent over the level of the previous year, thereby matching the increase which occurred between 1955 and 1956. As prices during the year showed little change, most of the advance represented an enlarged physical volume of production. Consumption of chemicals is estimated to have risen at a corresponding rate.

About one-sixth of chemical production in Canada is exported direct and the continued strength of the industry in the face of the hesitation experienced by many other manufacturing industries derived in part from the greater volume of Canadian chemicals sold in foreign markets. Also contributing to the advance in production was domestic manufacture of products hitherto imported, such as tetraethyl lead. Moreover, last year's business included greater purchases of chemicals and allied products by the construction industry, and increased domestic sales of fertilisers as well as recovery of export markets.

Chemical manufacturers continued to add to capacity during 1957, and total new fixed investment in the industry is estimated to have been only slightly below the previous peak of $141 million established in 1952. As the year progressed, shortages of construction materials and skilled labour began to ease, in contrast with 1956, when the limited availability of supplies and manpower caused some delays. The recent trend towards installation of facilities for diversification in the Canadian chemical industry was less marked than in the previous year, suggesting that for the present the most attractive opportunities have been taken up for the production of chemicals not previously manufactured in Canada.

Chemicals which were manufactured for the commercial market in Canada for the first time in 1957 included titanium dioxide, xanthates, synthetic silica-alumina cracking catalysts and hydrogen fluoride. In addition, new or expanded capacity has been completed or is currently under construction for a wide variety of established products. Of these, some of the more important inorganics are sulphur derived from natural gas; ammonia; tonnage oxygen, mainly required for metallurgical operations; hydrogen peroxide; and sodium chlorate, caustic soda and chlorine for which large installations were completed in British Columbia. Sulphuric acid capacity is being expanded by an estimated 70 per cent over the three years 1956 to 1958, stimulated to a large extent by the demand arising from uranium ore leaching.

Organic chemicals for which additional capacity was completed or under construction during the year included ethylene and other olefins, butadiene and benzene; coal tar chemicals; phenol and acetone by the cumene route; ethanolamines; nylon intermediates; polyester, polythene, polyvinyl chloride, nylon and other resins, their fibres and derivatives; and synthetic rubbers. Also completed were additional facilities for the manufacture of explosives and paints.

Although investment outlays by the industry in 1958 may not be maintained at the recent high rate, the backlog of unfinished projects is sufficiently large that capital expenditures for the coming year may be only moderately below those of 1957. Much of the industry's expansion in 1956 resulted in enlarged capacity for industrial inorganic chemicals, whereas current developments are more to expand existing organic petrochemical capacity.

Despite rising sales, new products and improved technology, the chemical industry is not without its difficulties. Owing to rising costs, in conjunction with extremely competitive market conditions due partly to low tariffs, final figures may show that profits in the chemical industry during 1957 fell below those of the previous year. It is apparent that the industry's efforts to increase productivity rates by making the most effective use of the resources at its command must be maintained, and even increased, if it is to remain competitive in the face of the increased chemical capacity of Germany and Japan, and, closer to home, the US. Contributing to the less favourable profit position is the inadequate return on new investments which chemical producers in Canada are frequently obliged to accept in order to obtain a position in the domestic market. Postponement would merely make later entry into the Canadian market still more difficult. It is noteworthy that at a similar stage of chemical industry development in the UK and in the US, diversification was made possible through the assistance in the home market of an adequate customs tariff.

Chemical Tariff Review

In Canada, at the request of the Minister of Finance, the Tariff Board will shortly commence hearings on its review of items in the tariff schedules relating to chemicals. The board's terms of reference in this review have recently been revised to include consideration of synthetic resins and ethylene glycol.

A recently completed study of the chemical industry, issued by the Gordon Commission on Canada's economic prospects, forecasts that the consumption of chemicals in Canada by 1980 should be about five times the level attained in 1955. Achievement of growth on this scale will depend to a large degree on the extent and quality of the chemical industry's research and development activities. In 1957 important additions were made to the industry's research facilities and it is estimated that the chemical industry accounts for almost one quarter of the investment in such assets by Canadian manufacturers.

Overseas News

CORAL RUBBER NOW BEYOND PILOT PLANT STAGE IN US

THE synthetic cis-polyisoprene (coral rubber) developed by Firestone Tire and Rubber Co., has been shown on US Army evaluation to have essentially the same physical and chemical properties as natural rubber. A report of the Quartermaster Research and Development Command (J. C. Montermoso, A. Wilson, and C. B. Griffis) has just been released in the US through the Office of Technical Services, US Department of Commerce, Washington 25, DC (Order PB 131232, 15 pages, 50 cents. 'Evaluation of Coral Rubber' (cis-polyisoprene).

Cis-isoprene, the basic material of natural rubber has been synthesised by several major US rubber companies with resulting properties reported to be identical to natural rubber. This study confirms that claim.

It is stated that the compound polymer tested is practically the same as the natural product in physical properties and ageing characteristics. Chemical resistance is reported to be almost identical. Also the synthetic material is said to be slightly superior to natural rubber in low-temperature tests.

Production of cis-polyisoprene, according to this report, offers the possibility of complete independence from overseas sources of natural rubber, as well as the possibility of reducing the costly (some £20 million a year) stockpiling of natural rubber.

This new synthetic rubber, which went into pilot plant production in the middle of 1955, is now being produced on a larger, but not yet commercial, scale.

Union Carbide Postpone Research Facilities Project

Because of what is termed worsening business conditions, Union Carbide Corporation, US, are postponing construction of multi-million dollar research and office facilities at Eastview, New York, US. The company will go ahead, however, with the building of a nuclear research centre at Tuxedo Park, New York.

Hong Kong Glassware

Heat resistant glassware, called 'Heatex', is now in production in Hong Kong. It is being made by I. Feng Enamelling Co.

Sales Record for Du Pont of Canada

Profits from additional sales volume for Du Pont Co. of Canada set up a new record in 1957. Net income, subject to audit, was equivalent to 60 cents per common share compared with 67 cents in 1956. However, these profits were offset in the second half of the year by heavy expenses associated with the initial operation of new units in the diversification programme. Expenditures on plant construction totalled $14,654,000 during 1957. Two large plants were completed and existing plants were being expanded.

Nylon yarn made further progress in the tyre cord market. Sales to textile manufacturers were greater last year than in 1956, but the textile industry as a whole continued to suffer from increasing imports.

Pesticide Tolerances in Canada

Manufacturers wishing to sell in Canada a pesticide which may leave a residue in or upon a crop have been urged to submit data to the Food and Drug Directorate of the Canadian Department of National Health and Welfare so that the residue may be evaluated in terms of consumer safety and a tolerance established by regulation under the Food and Drugs Act where necessary.

The information is contained in a letter (No. 157) from the Food and Drug Directorate. The full text of the letter, together with a list of pesticides recommended for use in or upon food crops, may be consulted at the Export Services Branch (Tariff Section), Board of Trade, Room 808, Lacon House, Theobalds Road, London WC1.

UK Instrument Agencies Sought in Chile

Fred Muller SAC, Agustinas 1350, Casilla 3894, Santiago, Chile, wish to represent UK manufacturers of scientific, medical and laboratory equipment, particularly nuclear physics instruments.

Chemical Engineering Exhibition in Oslo

An international chemical engineering exhibition, entitled 'Kjemi-Tetnikk 58', to be held in Oslo in October, will be the first of its kind in Scandinavia. Organised by the Norwegian Industries Development Association, a special section will be devoted to the products of the Norwegian chemical and electro-metallurgical industries. Further details can be obtained from the secretariat: Studieselskapet for Norsk Industri, Forskningsveien 1, Blindern/Oslo.

Canadian Talc Company Increases Capacity

Baker Talc Ltd., Montreal, leading producer of talc products in Canada, announce that the capacity of its talc mill at Highwater, Quebec, has been increased to 120 to 150 tons a day. The company operates two talc mines. New milling equipment permits the manufacture of a wide variety of additional products ranging from coarse talc for use in coating roofing paper and asphalt shingles to a fine product for use as a filler in paper to replace imported clays, and in lacquer, rubber goods and plastics. The company also produces dry insecticides by adding the chemicals to the talc ore, which, when milled, produces an insecticide ready for crop dusting and farm use.

Sicilian Sulphur Commission's Task

A special commission in Palermo is studying the problems of the Sicilian sulphur industry. Two tasks which have been set before the commission are (a) to find an economic method of replacing pyrites by raw sulphur in the production of sulphuric acid; and (b) to study the possibility of providing outlets for local sulphur by building on the spot factories to produce sulphuric acid, fertilisers and other chemical products.

Netherlands State Mines New Polythene Factory

Netherlands State Mines have begun the construction of a new factory for large-scale production of polythene to be marketed under the name Stamylan. Polythene has been manufactured by the State Mines for some time in a pilot plant using the Ziegler low-pressure process. The new factory will, however, use Imperial Chemical Industries' high pressure process. Annual capacity of 7,000 tons is expected.

South African Perfume Oil Industry Planned

Works by the South African National Chemical Research Laboratory and the South African Department of Agriculture may lead to the establishment of an essence-oil industry in the Union of South Africa. The country at present imports about £500,000 worth of oils per annum for use in perfumes, disinfectants, deodorants and toothpastes and for flavouring foodstuffs such as confectionery and soft drinks. Many of the oils are extracted from plants that can be grown in South Africa; and the plan is for the Department of Agriculture to grow them while the research laboratory will investigate methods of extraction and determine yields and quality.

It is thought that the establishment of an industry to produce these oils in the Bantu Reserves, where labour costs are low, might help in the development of these territories.

Alginate in Australia

British and US interests have made applications to the Government of Tasmania for licences to harvest seaweed. The UK applicants are Alginate Industries Ltd.

New Polyglycol Group by Dow

The Dow Chemical Co., Midland, Mich., have started volume production of seven new resin-grade polyglycols tailored for urethane use. The products include one diol and six triols, all based on glycerine, with propylene oxide as a building block. Special properties include a narrow pH range, very low water content, unusually narrow molecular weight range and dis-

tribution, absence of harmful ash, and low carbonyl level.

The diol, P-2000 (resin grade), is for use in flexible foams and elastomers. The number 2,000 is the product's molecular weight. The triols, known as the '11' series, are trihydroxy polypropylene glycols based on glycerine. They include 11-80 for rigid and semi-rigid foams and urethane coatings; 11-100 for semi-rigid foams; 11-200, 11-300 and 11-400 for flexible foams. The number 11 identifies the series, and the second number denotes the viscosity in centistokes at 100°F. The seventh new resin-grade polyglycol (112-3) is also a triol, and is intended for flexible foams where essentially all primary terminal hydroxyls are desired.

$10 Million Capital Budget by Polymer Corporation

To complete projects already under way and to cover new projects, Polymer Corporation, US, have announced a 1958 capital budget of $10 million. This includes plants now under construction in Europe and recently completed extensions to US productive capacity.

Despite the increasingly stiff competition, Polymer Corporation are stated to confidently anticipate marketing an increased output of their production over the immediate years ahead.

Extensions to Australian Phthalic Anhydride Plant

Newcastle Chemical Co. at Newcastle, Australia, a subsidiary of Imperial Chemical Industries of Australia and New Zealand and Broken Hill Proprietary, is extending its phthalic anhydride plant at Newcastle. The extensions will cost £A.1 million and are expected to supply all Australian demands for phthalic anhydride and to save Australia £A.500,000 a year in overseas funds.

CIL Anhydrous Ammonia Plant in Production

The $9,000,000 anhydrous ammonia plant of Canadian Industries Ltd. at Millhaven, Ontario, is now in commercial production. The new plant employs the latest industrial techniques for ammonia synthesis and is the only one of its kind in Canada using fuel oil as a raw material. The plant occupies ten acres adjacent to the company's Terylene polyester fibre plant located on Lake Ontario, 13 miles west of Kingston, Ontario. Daily production capacity of the plant is 200 tons.

Carbide Introduce New Higher Organic Silicates

Two new higher organic silicates, tetra (2-ethylbutyl) silicate and tetra (2-ethylhexyl) silicate, are now being produced by Union Carbide Chemicals Co., division of Union Carbide Corporation, New York, US. These organic silicates can be used in compounding synthetic lubricants and hydraulic fluids where mineral oils are not satisfactory. They have low viscosities at sub-zero temperatures, and in this respect, resemble silicones. But in addition, they are said to have excellent lubricating qualities, which most silicones lack.

Both tetra (2-ethylbutyl) silicate and tetra (2-ethylhexyl) silicate are characterised by relatively high specific heat, low viscosity, and low volatility—important properties of heat transfer fluids. Both of these silicates have freezing points below minus 100°F.

German Acetate Plant for Argentina

A medium-sized plant for the production of polyvinyl acetate at Lavallol, Argentina, is to be built by Farbwerke Hoechst and the Buenos Aires Compania Chimica. The plant is scheduled to start operations by the end of the year.

Canadian Tariff Hearing on Fluorspar

The Canadian tariff board hearing on fluorspar will be held in public, starting from 6 May. At present fluorspar enters Canada free of duty. A Canadian producer has applied for tariff protection by the imposition of a $10 duty per net ton of 2,000 lb. in respect of all grades of this material.

Pfizer's New Epoxy Curing Agent

Now available in research quantities in the US from Chas. Pfizer Inc. is methyl succinic anhydride, a new epoxy curing agent. The company report that initial experiments have shown that this compound increases pot-life of both aliphatic and aromatic epoxy resin formulations, even in smaller quantities than those usually required for anhydride curing agents. Pfizer also suggest that methyl succinic anhydride will have applications in hydrolysis, amidation, reduction, Friedel-Crafts reactions, Grignard reactions and esterification.

US Uranium Concentrate Production

The US Atomic Energy Commission report that the rate of uranium concentrate production reached 10,000 tons (U_3O_8) a year at the end of 1957. Domestic concentrate production was 8,640 tons, compared with 11,826 tons received from foreign sources. Some 146 tons of the domestic production were from by-product phosphate operations in Florida and Illinois, from treatment of Idaho euxenite at Mallinckrodt's St. Louis plant and from reprocessing of refinery residues at Vitro's Canonsburg, Pennsylvania, plant.

Montecatini's Satisfactory Year

Last year was a satisfactory one, the board of the Montecatini Company of Italy announce. Total group sales for 1957 exceeded by lire 14,000 million (£7 million approximately) those of the previous year (about lire 152,000 million, i.e. about £76 million). Total exports amounted to about lire 44,000 million (£2.2 million) an increase of almost 12 per cent over 1956.

Processing Waste Calcium Hydroxide from Acetylene Production

A NEW approach in recovering waste calcium hydroxide resulting as a by-product in the carbide process for producing acetylene has been made by Air Reduction's National Carbide Co.

Details of National Carbide's process have been released and it is announced that a $2 million plant is to be set up at Calvert City. Aqueous solution from the acetylene generator containing 12 to 15 per cent solid calcium hydroxide passes to three continuous solid-bowl centrifugal filters, each of which can handle 350 gallons of the slurry a minute. From these is discharged a calcium hydroxide paste containing about 60 per cent solids. This paste is conveyed to a rotating kiln, 220 ft. long and 11 ft. in diameter, heated to 2,000°F (by natural gas). This produces 335 tons of calcium oxide.

Before entering the kiln the paste is agitated by chains to promote heat transfer. At the exit end of the kiln the temperature of the dry calcium oxide is lowered to about 350°F by means of an air-cooled heat exchanger. The dry oxide pellets are dropped on to a pan conveyor where further cooling takes place to about 200°F. Then a vibrating screen separates out oversize particles which are crushed in a double roll crusher to a diameter of $\frac{1}{4}$ in. or less. The screened oxide is passed through a magnetic separator to remove iron particles.

The oxide particles ranging in size from about $\frac{1}{4}$ in. to $\frac{1}{8}$ in. are converted into briquets in six specially designed briquetting machines operated at a pressure of 60 tons per square inch. No binder is used. Highly compacted almond-shaped lumps measuring $1\frac{1}{2} \times \frac{3}{4} \times \frac{1}{2}$ in. are produced.

The company propose to use calcium hydroxide from the storage piles processing this as above.

Five years of development work have gone into this recovery process. Pilot-plant investigations have been carried out over the past three years at National Carbide's Louisville laboratories. Some 60 tons of calcium oxide a day are recovered. Current production of the Calvert City plant is stated to be 1,000 tons of calcium carbide a day.

When the recovery process starts operating with one kiln, late this year, it is expected that it will be able to supply somewhat less than one-third of the plant's total calcium oxide requirements. It is considered that the recovery unit will be able to process all of the calcium hydroxide from current production. When the second kiln is in operation, the unit will be able to process calcium hydroxide from the storage pile.

National Carbide believe that this recovery process will result in a substantial saving. The exact saving will not be known, however, until the unit has been in operation for a year. The company nevertheless are planning to build a similar $2 million plant at Louisville, construction to be started in 1959.

PEOPLE in the news

● MR. H. A. C. MCKAY of the chemistry division, AERE, Harwell, has been appointed director of the Baghdad Pact Nuclear Training Centre from July in succession to Mr. W. J. Whitehouse. Mr. McKay was born in 1913 and educated at Balliol College, Oxford. After service in the Royal Navy during the war, he was appointed a senior scientific officer in the chemistry division at Harwell and in 1954 became group leader of the heavy element group. He specialises in solution chemistry.

The Baghdad Pact Nuclear Training Centre was established in 1956 and it is concentrating at present on the practical applications of radioisotopes to the problems of Middle Eastern countries.

● DR. H. R. C. PRATT is to be leader of the chemical engineering section of the Australian Scientific and Industrial Research Organisation. He was formerly deputy chief scientific officer at the Atomic Energy Research Establishment. Recent work by the CSIRO has included the development of roasting techniques for the treatment of Australian copper ore and studies of gasification of brown coal.

● MR. J. E. DAVIES has been appointed sales manager of Extrudex Ltd., Western Road, Bracknell. He was previously assistant sales manager of the Steel Company of Wales. MR. M. J. HOWARD, until recently an assistant departmental manager of BX Plastics Ltd., has also joined Extrudex Ltd. as works manager at Bracknell.

● MR. D. F. PHILLIPS of the UK AEA was elected chairman of the microchemistry group of the Society for Analytical Chemistry at the recent annual meeting. Vice-chairman is MR. F. HOMES; hon. secretary, MR. D. W. WILSON, Sir John Cass College, Jewry Street, London EC3; and hon. treasurer, MR. G. INGRAM.

● In his annual report MR. D. ABEL SMITH, chairman of Borax (Holdings) for 20 years, informed shareholders that he is handing over the chairmanship to a younger man after the annual meeting. He will, however, remain on the board. LORD CLITHEROE, who has been on the board since 1947 and was appointed deputy chairman in 1955, will take over the chairmanship. MR. F. A. LESSER will be deputy chairman and continue as managing director. MR. A. J. SOMERS, a retiring director, is not seeking re-election to the board.

D. Bass, new UK sales manager for Cyclo Chemicals Ltd., 376 Strand, London WC2 (see CA, last week, page 330).

● MR. SAVERY F. CONEYBEAR has been appointed to the newly created position of director of new products development of the Colgate Palmolive Co., New York. He was formerly a director of research in the company's research and development department.

● MR. DAVID C. NUTTING, M.B.E., A.R.C.S., B.Sc., who recently joined the board of Solartron Industrial Controls Ltd., a member company of the Solartron Electronic Group, Thames Ditton, Surrey, was formerly project engineer and chief instrument engineer to E. B. Badger and Sons Ltd. Among his work there he dealt with process control and instrumentation for smaller chemical plants. Mr. Nutting is chairman of the control section, Society of Instrument Technology, and is the society's representative on the standing British conference on automation and computation.

● DR. L. P. MOORE has been appointed president of North American Cyanamid Ltd. in succession to MR. F. S. WASHBURN. Dr. Moore will be in charge of Cyanamid's Canadian activities, while Mr. Washburn will assume general managership of the phosphates and nitrogen division of American Cyanamid Company, the US parent firm. Dr. Moore has stated that plans are in hand to provide for supervision from Canada of all Canadian activities.

● Servomex Controls Ltd. have retained DR. JOHN DOUCE, of Manchester University, as consultant to advise on theoretical problems arising in the field of non-linear control systems, and systems subject to random fluctuations.

● MR. R. K. REYNOLDS has relinquished his position as a director of Spesco Developments Ltd., Chertsey, Surrey. Mr. Reynolds ceased to be sales director at the end of October and finally left the board at the end of December.

● MR. E. A. GOODLAND, general manager of the United Sulphuric Acid Corporation, Widnes, has been appointed technical director of sugar plantations in British Guiana owned by Booker Brothers, London and Liverpool. Mr. Goodland is 47.

● MR. H. W. VOIGT has been appointed vice-president of the Blockson Chemical division, Olin Mathieson Chemical Corporation.

● DR. W. ROBSON has been appointed professor of biochemistry at King's College, London University.

● MR. J. R. SURRIDGE has been appointed general manager of the Derby-Oxide and Colour Co. Ltd., suppliers of synthetic oxide pigments and rouges to the surface coating, rubber, polish, linoleum, plastics, optical and other trades. Mr. Surridge joins the company from the Lewis Berger group of companies.

● MR. S. L. WAIDE has become a member of the board of directors of Newton Chambers and Co. Ltd., Thorncliffe, near Sheffield.

He joined the company as a local director and general manager of the chemicals division in July, 1955, and since September, 1956, has been assistant managing director in charge of that division, which

J. R. Surridge

S. L. Waide

is concerned with the manufacturing and marketing of Izal products. Mr. Waide, who is 45, graduated from Brasenose College, Oxford, in 1934 and before joining Newton Chambers he was Works Director with T. J. Smith and Nephew Ltd., makers of Elastoplast.

Thriving Future for Plastics in FTA

DR. CYRIL CHILD, head of the information service division of development department of ICI Ltd. plastics division, told members of Liverpool Rotary Club on 17 February that 'given a free trade area, the British plastics industry can look forward to a thriving future.'

The introduction of a free trade area would give the British plastics industry a home market equal to—if not larger than—that of the US, the world's largest plastics producer, he said.

But if there should not be a free trade area then the industry would be in a very much more difficult position. Already Western Germany—half a defeated country—had achieved an annual output of 5 million tons compared with this country's output last year of about 420,000 tons.

World's Chemical Makers Urged To Ban High Strength Peroxide

A WORLD-WIDE organisation with the authority to ban the use of chemical products such as peroxide in war is proposed in a statement circulated by Mr. H. E. Alcock, of Alcock (Peroxide) Ltd., Luton. He first put his suggestions forward at a

H. E. Alcock

meeting of the Association of Chemical Manufacturers last October, and since then he has sent copies of his statement to 250 chemical manufacturers in this country, to the Soviet Embassy in London, and to certain German chemical manufacturers.

In his statement Mr. Alcock calls for the formation of a Universal Chemical Manufacturers' Association, free and independent of politics, which if and when formed would have the authority to ban the use of chemical products, such as high strength peroxide, etc., 'for the murder of children, women and men in any part of the world'.

Mr. Alcock says that his suggestion is based on a background of 60 years in the chemical industry, of which 42 years have been concerned with the development of Luton's chemical industry. During the last 36 years he has visited many countries in Europe and the US, in connection with their chemical industries, and particularly with regard to peroxide.

It was during one of his continental trips in 1937 that a friend of Mr. Alcock at Voikoski, on the Russian border of Finland, told him of experiments in Germany for the production of high strength peroxide of 100 per cent, about five times the strength used for industrial purposes. It appeared at the time that this development was in connection with reducing the cost of transport, and had no connection with the war.

In 1943 our Government learned that high strength peroxide was being used at Peenemunde, on the Baltic coast, for rocket propulsion and in reply to their request that they would require thousands of tons, Mr. Alcock stated that it would take at least five years to obtain and erect the plant required. No further action was taken by Alcock (Peroxide) Ltd. Since the end of the war peroxide factories have been erected in many parts of the world, and all of them will be aware of the war potential of this product.

Mr. Alcock told CHEMICAL AGE that since circulating his statement he has had many interesting replies and has been most encouraged by the support promised for his proposals.

Metal Traders Become UK Sales Agents for Canadian Asbestos Producer

SALES in the UK, Eire, Spain and Portugal, of the asbestos produced by Lake Asbestos of Quebec Ltd., will be handled by the asbestos division of Metal Traders Ltd., 7 Gracechurch Street, London EC3. Metal Traders have appointed Mr. Charles Z. Carroll-Porczynski, a widely recognised expert on asbestos, as manager of their asbestos division. Mr. Carroll-Porczynski has done extensive research on the testing and improvement of asbestos for industry, and especially on the improvement of asbestos textiles.

He was formerly employed in the research department of British Belting and Asbestos Co. Ltd., where he was responsible for the development of plasticised asbestos cloth, which has proved successful on British Railways. He is author of the recently published book, 'Asbestos—from Rock to Fabric,' a comprehensive study of the whole asbestos industry.

Lake Asbestos of Quebec, a wholly-owned subsidiary of American Smelting and Refining Co., New York, represent a new source of chrysotile asbestos. At Black Lake, the firm is developing extensive deposits of high-quality asbestos, and completing a $9.2 million mill to process the ore into all grades of asbestos fibre.

Annual output of the mill, which is expected to go into production early in 1958, will be about 100,000 tons of asbestos, an estimated 7 per cent addition to the free world's supply. This will all be sold to industrial consumers, as the company will not make asbestos end-products itself. Black Lake reserves are said to be sufficient for more than 40 years' operation.

New Offices for ICI Alkali Division

A NEW office block for management and staff of the Wallerscote Works, Cheshire, of ICI alkali division, was officially opened by Mr. J. K. Batty, the division chairman, on 10 February.

Outlining the progress of the works since it first began producing soda in 1926, Mr. Batty said Wallerscote was the largest ammonia-soda factory in the British Commonwealth and possibly the largest in the world. Wallerscote, he said, was something of which not only alkali division and ICI, but the country as a whole, could very well be proud. He recalled that it was on the Wallerscote site that the world's first polythene plant was built.

The two-story building has been designed on modern lines by the division's own civil engineering department.

SCC Congress on Cosmetic Science

A CONGRESS on cosmetic science will be held by the Society of Cosmetic Chemists of Great Britain on 15 to 17 April, 1959. It will cover the practical rather than the theoretical aspects of the industry. Subjects to be discussed will be:

Analysis. (1) Physical measurements (2) Quality control methods (3) Assessment of taste and odour (4) Assessment of product appeal (5) Analysis of essential oils and perfumery materials (6) Analysis of perfume compounds and matching (7) Mechanised laboratory methods.

Manufacturing and Engineering. (1) Mixing, milling and storing (2) Clarification and filtration (3) Corrosion (4) Heat transfer.

Product Evaluation. (1) Stability (2) Patch testing methods (3) Advances in skin histology (4) Advances in allergy research.

Full details of the arrangements will be available in June this year and those interested should write to the hon. organiser, Dr. R. H. Marriott, County Laboratories Ltd., County Buildings, Honeypot Lane, Stanmore, Middlesex, before 1 June.

Obituary

MR. F. D. ASCOLI, managing director of Dunlop Plantations Ltd. until his retirement in 1955 and a former president of the Institution of the Rubber Industry, has died at the age of 74. His services to the industry included the introduction of latex shipments in bulk and of the centrifuging process in Malaya. It was largely due to him that latex manufacture developed from the laboratory stage to an industry with a production capacity of over 10 million gallons a year.

DR. CLINTON J. DAVISSON has died at Charlottesville, Virginia, US, aged 76. Dr. Davisson was awarded the Nobel prize for physics in 1937 which he shared with Professor Sir George Thomson. He discovered the diffraction of electrons by crystals.

MR. A. RODWAY, former Midlands representative of Borax and Chemicals Ltd., died on Thursday 13 February, his 70th birthday.

For over 30 years Mr. Rodway was concerned with the sale and distribution of Three Elephant brand boron products in the Midlands, South Wales and eastern counties until his retirement in 1955. He was for many years an active member of the Institute of Vitreous Enamellers and of the Society of Glass Technology until failing health prevented his attendance at their meetings.

The death occurred recently at St. Albans, Herts, of MR. GEORGE WILLIAM SINCLAIR. Mr. Sinclair was born in Glasgow, where he served an apprenticeship in marine engineering. He went from there to Germany where he studied physical chemistry. He held posts with North Western Cyanamid, Nitrogen Products and Carbide Co., and Alby United Carbide Factories Ltd. He was a pioneer in perfecting the process for the safe manufacture of cyanamid.

CHEMICAL PIONEERS

15 William Gossage

Holder of 50 patents covering 153 subjects, William Gossage had a position of the highest authority in the chemical industry. Perhaps his greatest invention was the hydrochloric acid absorption tower which he built in an old windmill to prevent the clouds of fumes emitted by the works of the British Alkali Co., of which he was a founder. When Gladstone repealed the duty on soap, Gossage, who was by then established at Widnes, was already well placed to take advantage of this move.

WILLIAM GOSSAGE was born in 1799 in the Lincolnshire village of Burgh-le-Marsh, the 13th child of his parents. Where he received his early education is unknown; it was not continued beyond an elementary level, for at the age of 12, or soon afterwards, he was apprenticed to an uncle who was a chemist and druggist in Chesterfield.

During this apprenticeship Gossage read the standard chemical textbooks of the time and, from a French refugee acting as his tutor, acquired a competent knowledge of French. By 1823 he was living at Leamington Prior where he became a druggist on his own account and embarked upon the production of Leamington salts.

Stoke Prior Deposits

In 1825 William Furnival located industrially valuable salt deposits at Stoke Prior in Worcestershire. Shortly afterwards Jonathan Fardon and Thomas Langley began salt manufacture on the newly-discovered saltfield. Within a short time they sold out for £70,000 to the British Rock and Patent Salt Co., a concern with which Furnival was associated.

Fardon remained a manager at Stoke Prior and in 1829 he acquired an eight-acre site alongside the Birmingham-Worcester canal where he established himself as a salt and alkali manufacturer, taking into partnership William Gossage, who, in 1830, gave up his business in Leamington. Fardon and Gossage's business was reconstituted in 1835 as the British Alkali Co. to manufacture 'salt, soda, soap, bleaching powder and other articles'.

The British Alkali Co. soon found themselves in trouble with their farming neighbours, because of the destructive clouds of hydrochloric acid drifting over the fields. Like Tennant and Muspratt, they attempted to solve their problem by erecting a high chimney. Gossage, however, was already in search of a more effective solution.

Near the works stood a derelict windmill, the tower of which Gossage packed with gorse and brushwood. Irrigating this packing with a downward stream of water, and passing acid fumes from the factory co-current with it, he found that little or no fume appeared at the bottom. Thus Gossage discovered the principle of film absorption and made his most important contribution to the 19th-century heavy chemical industry—the hydrochloric acid absorption tower.

In 1836, when he patented his absorption tower, Gossage became interested in white lead and, in association with Edward White Benson, manager of the Stoke Prior works, patented a process for its manufacture. Gossage was almost certainly one of the partners with whom Benson established the British White Lead Co. in Birmingham to exploit various white lead processes. The White Lead Co. became bankrupt in 1842, and Benson died in February of the following year.

Gossage was also occupying much of his time with another problem of alkali manufacture—the recovery of the sulphur imprisoned in the steadily rising mounds of alkali waste which surrounded every alkali works. Confident, at one stage, that he had solved the problem, Gossage rashly contracted to take alkali waste from other manufacturers in order to recover sulphur from it by liberation of sulphuretted hydrogen by treatment with carbon dioxide; this enterprise failed disastrously for Gossage.

The fault was not the inventor's, but the primitive state of the chemical engineering of the time. It was the inadequacy of chemical engineering technology, too, that brought to naught the Gossage ammonia-soda process which he and Henry Deacon attempted to work in Widnes in 1853–5.

Whatever the precise nature of Gossage's later connection with the alkali-making concern at Stoke Prior, it does not appear to have been such that it necessitated his continuous residence there. In the years 1843–5 he was associated with Henry Hussey Vivian and others in the development at Neath, South Wales, of processes for the recovery of zinc and copper from their ores. Two years later Gossage was at the Ardwick Bridge works of Tennant and Co., where he acted as assistant to James Young, who was then engaged in developing paraffin refining processes.

At Widnes, where he settled in 1850, Gossage carried on a series of small-scale chemical enterprises on a site which he purchased near the canal, opposite the alkali works of John Hutchinson. The years 1850–5 were spent by Gossage in experimental pursuit of his interests in sulphur recovery, ammonia-soda manufacture, and copper refining, as well as in production of soda by the Leblanc process, which last was probably his main source of income at this time.

Towards the end of the period he became interested in soap-making. In 1854 the price of tallow had risen greatly and Gossage turned his attention to making cheap soaps containing sodium silicate. On 5 July 1853 Gladstone's Government removed the duty on soap and Gossage found himself well placed to exploit the expanding market for this commodity.

Gossage continued through his later years to take out patent after patent for inventions in connection with almost every aspect of heavy chemical manufacture. Somewhat sarcastically, Henry Deacon, in 1862, in his evidence before the Select Committee on Noxious Vapours, remarked: 'Mr. Gossage has taken out 50 patents between 1823 and 1860, embracing 153 different subjects, out of which only four or five have been successful'.

It is recorded of him that Gossage was a man of most impressive and dignified presence and genial and honourable nature. In the chemical industry of his time he held a place of the highest authority. On two occasions, in 1857 and 1870, he reported to the meetings of the British Association on the state of the alkali industry. William Gossage was granted his last patent in 1872. He died at his home at Bowden, Cheshire, on 9 April 1877.

BT-H Equipment for Chemical Firms

PROGRESS in control gear, semiconductors and motors for chemical plant is reported in the annual review of British Thomson-Houston Ltd., Rugby.

They have installed 910 motors ranging from 1 to 170 h.p. for the Mond Nickel Co. Ltd. The acrylic fibre plant of Chemstrand Ltd. in Northern Ireland has had motors totalling 2,400 h.p. installed for plant and process equipment, ranging from 25 h.p. to 265 h.p. Sixty unexcited synchronous motors ranging from 3 to 10 h.p. are being supplied for spinning, crimping, cutting and baling the fibre: this plant will be commissioned early this year.

Du Pont (UK) Ltd. have placed an order for motors up to 200 h.p. for their Northern Ireland chemical plant. During 1957 78 motors have been supplied to Fisons Ltd., Immingham, for extensions to their sulphuric acid and potassium fluorosilicate plants. A 2,144 kW motor-generator set, comprising a synchronous motor driving two generators, was commissioned in a chemical works, and a further order has been received from the same customer for another machine rated at 3,330 kW, the ninth supplied for this installation. Another order received during the year was for eight variable speed d.c. motors rated at 1,100/550 h.p., 172/86 r.p.m., with associated mercury-arc rectifier equipment, for driving compressors in a chemical factory.

Control gear, type MCC, is being supplied to ICI alkali division, for installation at the polythene plant at Wilton. Six contractor boards totalling 102 feet and controlling 78 motors ranging from 45 to 130 h.p. have been installed.

Many semiconductor devices are under production. Although point-contact diodes using germanium metal are still the largest in demand, p-n junction rectifiers have been firmly established in production quantities and these have recently been designed into bridge units for both single and three-phase operation. The coming year will see the transfer of silicon junction rectifiers from the advanced development stage, and a comprehensive range of small and medium power rectifiers is planned. A range of industrial-sized transistors is also planned.

TRADE NOTES

British Sulphur Corporation Ltd. are changing their address to Fison House, 95 Wigmore Street, London W1, as from Monday 24 February. Telephone number will be WELbeck 5500.

Potteries Agency

Borax and Chemicals Ltd., 35 Piccadilly, London W1, have appointed Ralph Lawton Ltd. as their agents in the Potteries for Three Elephant brand boron products. From 1 March, Ralph Lawton Ltd., who are millers and distributors of sands, clays and minerals, will operate from their new address at Rose Vale, Chesterton, Newcastle, Staffs (Newcastle-under-Lyme 68073).

Change of Name

British General Manufacturing Co. (1941) Ltd., chemical manufacturers, etc., 14/18 High Holborn, London WC1, have changed their name to British General Manufacturing Co. Ltd.

Hypalon Distributors

A plant for Du Pont de Nemours at Beaumont, Texas, US, is now producing Hypalon synthetic rubber at the rate of 15 million lb. per year. The new plant, which replaces limited facilities at Charleston, West Virginia, will, it is stated, ensure that increased supplies of Hypalon will be available through the UK distributors, Durham Raw Materials Ltd., 1-4 Great Tower Street, London EC3.

Borax Price Changes

With reference to the price increases announced by Borax and Chemicals Ltd., 35 Piccadilly, London W1, on 10 January (see CHEMICAL AGE, 18 January, p. 75), the company now inform us that on account of a small concession (advised as temporary) in ocean freight rates, the benefit of which is being immediately passed on to customers, Borax and Chemicals are reducing the previously notified prices by 10s per ton. The revised prices were effective from 17 February as follows:

			Borax £ s	Boric acid £ s
Pyrobor (dehydrated)	paper bags		67 0	—
	hessian	,,	68 0	—
V-Bor (refined pentahydrate)	paper	,,	55 10	—
	hessian	,,	56 10	—
Commercial granular	paper	,,	45 0	75 10
	hessian	,,	46 0	76 10
,, crystal	hessian	,,	48 10	84 10
,, powder	paper	,,	48 10	81 0
	hessian	,,	49 10	82 0
,, powder extra fine	paper	,,	49 10	83 0
	hessian	,,	50 10	84 0
BP grade granular	paper	,,	not produced	88 10
	hessian	,,	not produced	89 10
,, crystal	hessian	,,	57 10	96 10
powder	paper	,,	57 10	93 0
	hessian	,,	58 10	94 0
,, powder extra fine	paper	,,	58 10	95 0
	hessian	,,	59 10	96 0

Prices are per ton, net weight, free delivered customers' works in the UK. (Hessian bags are polythene lined and are returnable with good allowances.)

Platinum prices

The two leading UK refiners, Baker Platinum Ltd. and Johnson Matthey and Co. Ltd., have announced further reductions in the price of platinum from £28 10s to £26 15s per troy ounce. Prices were reduced on 5 December last by 50s (CHEMICAL AGE, 28 December, p. 1042). In the free market the price has fallen to about £25 an ounce.

Market Reports

STEADY TRADE IN MOST SECTIONS

LONDON Steady trading conditions have been reported for most sections of the industrial chemicals market with home demand running at about the recent level and a good intake against contracts. The volume of export enquiry is keeping up fairly well. Among the soda products caustic, chlorate, dichromate and yellow prussiate of soda are in steady call, and a moderate trade is passing in the potash chemicals section.

Borax and boric acid are in good request. The new prices for these products, scheduled to operate from 17 February, are now 10s per ton less than those previously notified. The adjustment is made possible by a reduction in ocean freight rates. Copper sulphate is now £3 per ton lower at £64 per ton less two per cent f.o.b. Liverpool. A continued improvement in the demand for fertilisers has been reported. Prices on the coal tar products market are well held and most items are moving steadily.

MANCHESTER Prices on the Manchester chemical market have maintained a steady to firm undertone generally, although the continued weakness of copper has been reflected in a further decline in sulphate of copper. Industrial consumers are mostly drawing steadily against contracts and shipping business is keeping up fairly well. Additional home and export enquiries covering numerous lines have been circulating. The movement of fertilisers continues to improve and most of the tar products are finding a steady outlet.

GLASGOW The demand against contract requirements continued on a steady scale during the past week. Other business transacted was mostly concerned with current requirements, although some forward bookings were placed. Prices generally throughout were on a steady basis with some alterations being reported. Considerable interest and activity is still shown in regard to the export market. Agricultural chemicals are showing a little more activity, but mostly in connection with forward requirements.

DIARY DATES

MONDAY 24 FEBRUARY

SCI—London: 14 Belgrave Square SW1. 5.30 p.m. AGM of surface active agents panel, 'How surface active agents work' by J. L. Moilliet.

TUESDAY 25 FEBRUARY

Incorporated Plant Engineers—London: Royal Society of Arts, John Adam Street WC2. 6.30 p.m. Annual general meeting.

Institute of Metals—Birmingham: College of Technology, Gosta Green. 9.30 a.m. and 2.15 p.m. Symposium on 'Metallurgical aspects of semi-conductors'.

I Chem E—Birkenhead: Technical College. 7 p.m. 'Ion-exchange as a unit operation' by R. Kressman.

SCI—London: 14 Belgrave Square SW1. 5.30 p.m. The Jubilee Memorial Lecture, 'A plastics jubilee: 1907-1957' by G. Dring.

WEDNESDAY 26 FEBRUARY

Manchester Literary & Philosophical Society (Chemical Section)—Manchester: Portico Library, 57 Mosley Street. 6 p.m. 'Examination of materials using electrons'.

Manchester Metallurgical Society—Manchester: Central Library. 6.30 p.m. 'Metallurgy of tantalum, niobium and beryllium' by G. L. Miller.

RSA—London: Royal Society of Arts, John Adam Street WC2. 2.30 p.m. The Fernhurst Lecture 'Gibberellic acid: a new plant hormone controlling growth and flowering' by P. W. Brian.

SAC—London: Royal Society, Burlington House, Piccadilly W1. 4.30 p.m. Annual general meeting. 5 p.m. The Bernard Dyer Memorial Lecture 'Science and politics' by Sir Hugh Linstead.

THURSDAY 27 FEBRUARY

CS—London: Anatomy Lecture Theatre, King's College, Strand WC2. 7.30 p.m. The Liversidge Lecture 'Some isothermal reactions of free radicals studied by kinetic spectroscopy' by Prof. R. G. W. Norrish.

CS, RIC & SCI—Bristol: Chemistry Department, The University. 6.30 p.m. 'Some studies of very rapid reactions' by Prof. G. Porter.

Fertiliser Society—London: Geological Society, Burlington House, Piccadilly W1. 2.30 p.m. 'Gaseous effluents from granulation plants' by F. J. Harris.

Fertiliser Society—London: May Fair Hotel W1. 7.15 p.m. Dinner to celebrate 10th anniversary of society.

Institute of Petroleum—London: Institution of Electrical Engineers, Savoy Place, Victoria Embankment WC2. And Friday, 28 February. 9 a.m. each day. Conference on molecular spectroscopy.

Institution of The Rubber Industry & Plastics Institute—London: Institution of Civil Engineers, Great George Street SW1. 9.30 a.m. Conference on 'Recent advances in polymer technology'.

Royal Society—London: Burlington House, Piccadilly W1. 4.30 p.m. 'Studies in enzyme cytochemistry', by S. Cotson, S. J. Holt, D. G. O'Sullivan, P. W. Sadler and R. F. J. Withers. Communicated by Sir Charles Dodds.

FRIDAY 28 FEBRUARY

CS—Cambridge: University Chemical Laboratory, Lensfield Road. 8.30 p.m. 'Low polymers of styrene' by Prof. J. C. Robb.

OCCA—London: Savoy Hotel, Strand WC2. 7 p.m. Biennial dinner and dance.

RIC (London section) & SCI (London section)—London: Caxton Hall SW1. 7.30 p.m. Buffet dance.

SAC—Edinburgh: George Hotel, George Street. 7 p.m. 'The solvent extraction of metal complexes' by F. J. C. Rossotti.

KW Chemicals

K. W. Chemicals Ltd., 41 Kingsway, London WC2, have been appointed exclusive concessionaires in the UK for Drierite, stated to be an all-purpose desiccant for solids, liquids and gases, including organic liquids, all refrigerants, solvent recovery, production of anhydrous liquids, industrial gases and for air conditioning. The US manufacturers are W. A. Hammond Drierite Co. of Ohio, in association with Spett. Ing. G. and A. Punzi of Italy.

Will

MR. JAMES HARNAMAN, formerly the first resident director and general manager of the Baronet Works, Walton, of Laporte Chemicals Ltd., left £11,389 net.

BRITISH CHEMICAL PRICES

GENERAL CHEMICALS

Acetic Acid. D/d in ret. barrels (tech. acid barrels free); in glass carboys, £8; demijohns, £12 extra. 80% tech., 10 tons, £97; 80% pure, 10 tons, £103; commercial glacial, 10 tons, £106.

Acetic Anhydride. Ton lots d/d, £136.

Alum, Ground, f.o.r., about £25.
MANCHESTER: Ground, £25.

Aluminium Sulphate. Ex-works, d/d, £15 10s to £18.
MANCHESTER: £16 to £18 10s.

Ammonia, Anhydrous. Per lb., 1s 9d,-2s 3d.

Ammonium Chloride. Per ton lot, in non-ret. pack, £27 to £30 2s 6d.

Ammonium Nitrate. D/d, 4-ton lots, £31.

Ammonium Persulphate. Per cwt., in 1-cwt. lots, d/d, £6 13s 6d; per ton, in min. 1-ton lots, d/d, £123 10s.

Ammonium Phosphate. Mono-and di-, ton lots, d/d, £106 and £97 10s.

Antimony Sulphide. Per lb., d/d UK in min. 1-ton lots: crimson, 4s 7d to 5s 0½d; golden, 2s 10½d to 4s 3½d.

Arsenic. Ex-store, £45 to £50.

Barium Carbonate. Precip., d/d, 4-ton lots, bag packing, £41.

Barium Chloride. 2-ton lots, £49.

Barium Sulphate [Dry Blanc Fixe]. Precip. 2-ton lots, d/d, £43.

Bleaching Powder. Ret. casks, c.p. station, in 4-ton lots. £30 7s 6d.

Borax. Ton lots, in hessian sacks, c.p. Tech., anhydrous, £68; gran., £46; crystal, £48 10s; powder, £49 10s; extra fine powder, £50 10s; BP, gran., £55 10s; crystal, £57 10s; powder, £58 10s; extra fine powder, £59 10s. Most grades in 6-ply paper bag, £1 less.

Boric Acid. Ton lots, in hessian sacks, c.p. Tech., gran., £76 10s; crystal, £84 10s; powder, £82; extra fine powder, £84; BP gran., £89 10s; crystal, £96 10s; powder, £94; extra fine powder, £96. Most grades in 6-ply paper bag, £1 less.

Calcium Chloride. Ton lots, in non-ret. pack: solid and flake, about £15.

Chlorine, Liquid. In ret. 16-17-cwt. drums d/d in 3-drum lots, £40.

Chromic Acid. Less 2½%, d/d UK, in 1-ton lots, per lb., 2s 2½d.

Chromium Sulphate, Basic. Crystals, d/d, per lb., 8½d; per ton, £79 6s 8d.

Citric Acid. 1-cwt. lots, per cwt., £11 5s.

Cobalt Oxide. Black, per lb., d/d, bulk quantities, 13s 2d.

Copper Carbonate. Per lb., 3s 3d.

Copper Sulphate. F.o.b., less 2% in 2-cwt. bags, £64.

Cream of Tartar. 100%, per cwt., about £11 12s.

Formaldehyde. In casks, d/d, £39 10s.

Formic Acid. 85%, in 4-ton lots, c.p., £89.

Glycerine. Chem. pure, double distilled 1,260 s.g., per cwt., in 5-cwt. drums for annual purchases of over 5-ton lots and under 25 tons, £10 1s 6d. Refined pale straw industrial, 5s per cwt. less than chem. pure.

Hydrochloric Acid. Spot, per carboy, d/d (according to purity, strength and locality), about 12s.

Hydrofluoric Acid. 60%, per lb., about 2s 3d per lb.

Hydrogen Peroxide. Carboys extra and ret. 27.5% wt., £128 10s; 35% wt., d/d, £158.

Iodine. Resublimed BP, under 1 cwt., per lb., 14s 4d; for 1-cwt. lots, per lb., 13s 5d.

Iodoform. Under 1 cwt., per lb., £1 2s 11d, for 1-cwt. lots, per lb., £1 2s 3d.

These prices are checked with the manufacturers, but in many cases there are variations according to quality, quantity, place of delivery, etc.

Abbreviations: d/d, delivered; c.p., carriage paid; ret., returnable; non-ret. pack., non-returnable packaging; tech., technical; comm., commercial; gran., granular.

All prices per ton unless otherwise stated

Lactic Acid. Pale tech., 44% by wt., per lb., 14d; dark tech., 44% by wt., per lb., 9d; chem. quality, 44% by wt., per lb., 12½d; 1-ton lots, ex-works, usual container terms.

Lead Acetate. White, about £154.

Lead Nitrate. 1-ton lots, about £135.

Lead, Red. Basis prices: Genuine dry red, £106 10s: orange lead, £118 10s. Ground in oil: red, £127 5s, orange, £139 5s.

Lead, White. Basis prices: Dry English in 5-cwt. casks, £118; Ground in oil: English, 1-cwt. lots, per cwt., 194s.

Lime Acetate. Brown, ton lots, d/d, £40; grey, 80-82%, ton lots, d/d, £45.

Litharge. In 5-ton lots, £108 10s.

Magnesite. Calcined, in bags, ex-works, about £21.

Magnesium Carbonate. Light, comm., d/d, 2-ton lots, £84 10s under 2 tons, £97.

Magnesium Chloride. Solid (ex-wharf), £17 10s.

Magnesium Oxide. Light, comm., d/d, under 1-ton lots, £245.

Magnesium Sulphate. Crystals, £16.

Mercuric Chloride. Tech. powder, per lb., for 5-cwt. lots, in 28-lb. parcels, £1 0s 6d; smaller quantities dearer.

Mercury Sulphide, Red. 5-cwt. lots in 28-lb. parcels, per lb., £1 9s 3d.

Nickel Sulphate. D/d, buyers UK, nominal, £170.

Nitric Acid. 80° Tw., £35.

Oxalic Acid. Home manufacture, min. 4-ton lots, in 5-cwt. casks, c.p., about £129.

Phosphoric Acid. Tech. (s.g. 1.700) ton lots, c.p., £100; BP (s.g. 1.750), ton lots, c.p., per lb. 1s 4d.

Potash, Caustic. Solid, 1-ton lots, £95 10s; liquid, £36 15s.

Potassium Carbonate. Calcined, 96/98%, 1-ton lots, ex-store, about £74 10s.

Potassium Chloride. Industrial, 96%, 1-ton lots, about £24.

Potassium Dichromate. Crystals and gran., per lb., in 5-cwt. to 1-ton lots, d/d UK, 1s 2½d.

Potassium Iodide. BP, under 1-cwt., per lb., 9s; per lb. for 1-cwt. lots, 8s 6d.

Potassium Nitrate. 4-ton lots, in non-ret. pack, c.p., £63 10s.

Potassium Permanganate. BP, 1-cwt. lots, per lb., 1s 11½d; 3-cwt. lots, per lb., 1s 10½d; 5-cwt. lots, per lb., 1s 10½d; 1-ton lots, per lb., 1s 10d; 5-ton lots, per lb., 1s 9½d. Tech., 5-cwt. in 1-cwt. drums, per cwt., £9 15s 6d; 1-cwt. lots, £10 4s 6d.

Salammoniac. Ton lot, in non-ret. pack, £47 10s.

Salicylic Acid. MANCHESTER: Tech., d/d, per lb., 2s 5d., 1-ton lots.

Soda Ash. 58% ex-depot or d/d, London station, 1-ton lots, about £17 3s.

Soda, Caustic. Solid 76/77%: spot, d/d 1-ton lots, £33 16s 6d.

Sodium Acetate. Comm. crystals, d/d, £91.

Sodium Bicarbonate. Ton lot, in non-ret. pack., £16 10s.

Sodium Bisulphite. Powder, 60/62%, d/d, 2-ton lots for home trade, £46 2s 6d.

Sodium Carbonate Monohydrate. Ton lot, in non ret. pack, c.p., £57.

Sodium Chlorate. 1-cwt. drums, c.p. station, in 4-ton lots, about £88 10s.

Sodium Cyanide. 96/98%, ton lot in 1-cwt. drums, £113 5s.

Sodium Dichromate. Crystals, cake and powder, per lb., 1s. Net d/d UK, anhydrous, per lb., 1s 1½d. Net. del. d/d UK, 5-cwt. to 1-ton lots.

Sodium Fluoride. D/d, 1-ton lots and over, per cwt., £5; 1-cwt. lots, per cwt., £5 10s.

Sodium Hyposulphite. Pea crystals, £38; comm., 1-ton lots, c.p., £34 15s.

Sodium Iodide. BP, under 1 cwt., per lb., 14s 1d; 1-cwt. lots, per lb., 13s 2d.

Sodium Metaphosphate [Calgon]. Flaked, paper sacks, £133.

Sodium Metasilicate. (Spot prices) D/d UK in 1 ton lots, 1 cwt. free paper bags, £27 10s.

Sodium Nitrate. Chilean refined gran. over 98%, 6-ton lots, d/d c.p., £29 10s.

Sodium Nitrite. 4-ton lots, £32.

Sodium Perborate. (10%0) in 1-cwt. free kegs, ton lots, £145 15s.

Sodium Percarbonate. 12½% available oxygen, per cwt., in 1-cwt. kegs, £8 10s 9d.

Sodium Phosphate. D/d, ton lots: di-sodium, crystalline, £40 10s, anhydrous, £88; tri-sodium, crystalline, £39 10s, anhydrous, £86.

Sodium Silicate. (Spot prices) 75-84° Tw. Lancs and Ches., 4-ton lots, d/d station in loaned drums, £11 17s 6d; Dorset, Somerset and Devon, per ton extra, £3 17s 6d; Scotland and S. Wales, extra, £3. Elsewhere in England, not Cornwall, extra, £1 12s 6d.

Sodium Sulphate [Desiccated Glauber's Salt]. D/d in bags, about £20.

Sodium Sulphate [Glauber's Salt]. D/d, £18 10s to £18 15s.

Sodium Sulphate [Salt Cake]. Unground, d/d station in bulk, £10.
MANCHESTER: d/d station, £10 10s.

Sodium Sulphide. Solid, 60/62%, spot, d/d, in drums in 1-ton lots, £36 2s 6d; broken, d/d, in drums in 1-ton lots, £37 2s 6d.

Sodium Sulphite. Anhydrous, £71 10s; comm., d/d station in bags, £27-£28 10s.

Sulphur. 4 tons or more, ground, according to fineness, £20-£22.

Sulphuric Acid. Net, naked at works, 168° Tw. according to quality, £10 10s.-£12 2s 6d; 140° Tw., arsenic free, £8 15s.; 140°Tw., arsenious, £8 9s 6d.

Tartaric Acid. Per cwt.: 10 cwt. or more, £14; 1 cwt., £14 5s.

Titanium Oxide. Standard grade comm., rutile structure, £178 5s.; standard grade comm., anatase structure, £162 5s.

Zinc Oxide. Max. for 2-ton lots, d/d, white seal, £92; green seal, £90; red seal, £87.

SOLVENTS AND PLASTICISERS

Acetone. All d/d. In 5-gal. drums, £128 in 10-gal. drums, £118; in 40-45-gal. drums, under 1 ton, £93; 1-5 tons, £90; 5-10 tons, £89; 10 tons and up, £88; in 400-gal. tank wagons, £85.

Butyl Acetate BSS. 10-ton lots, £173.

***n*-Butyl Alcohol BSS.** 10 tons, in drums, d/d, £152.

***sec*-Butyl Alcohol.** All d/d. In 5-gal. drums, £168; in 10-gal. drums, £158; in 40-4-5 gal. drums, under 1 ton, £133; 1-5 tons, £130; 5-10 tons, £129; 10 tons and up, £128; in 400-gal. tank wagons, £125.

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PS H-6956-100

tert-**Butyl Alcohol.** 5-gal. drums, £195 10s; 40/45-gal. drums: 1 ton, £175 10s; 1-5 tons, £174 10s; 5-10 tons, £173 10s; 10 tons and up, £172 10s.
Diacetone Alcohol. Small lots: 5-gal. drums, £185; 10-gal. drums, £175. 40/45-gal. drums: under 1 ton, £148; 1-5 tons, £147; 5-10 tons, £146; 10 tons and over, £145, in 400 gal. tank wagons; £142.
Dibutyl Phthalate. In drums, 10 tons, d/d, per ton, £222; 45-gal. drums, d/d, per lb., 2s ½d.
Diethyl Phthalate. In drums, 10 tons, per ton, £187 10s; 45-gal. drums, d/d, per lb., 1s 9d.
Dimethyl Phthalate. In drums, 10 tons, per ton, d/d, £179, 45-gal. drums, d/d, per lb., 1s 8d.
Dioctyl Phthalate. In drums, 10 tons, d/d, per lb., 2s 8d; 45-gal. drums, d/d, per lb., 2s 9½d.
Ether BSS. 1-ton lots, drums extra, per lb., 1s 11d.
Ethyl Acetate. 10-ton lots, d/d, £145.
Ethyl Alcohol [PB 66 o.p.]. Over 300,000 p. gal. 4s 0½d; d/d in tankers, 2,500-10,000 p. gal., per p. gal., 4s 2¾d. D/d in 40/45-gal. drums, p.p.g. extra, 1d.
Absolute alcohol (75.2 o.p.), p.p.g. extra, 5d.
Methanol. Pure synthetic, d/d, £43 15s.
Methylated Spirit. Industrial 66° o.p.: 500-gal. and up, d/d in tankers, per gal., 5s 10½d; 100-499 gal. in drums, d/d, per gal., 6s 3d-6s 5d. Pyridinised 66 o.p. : 500 gal. and up, in tankers, d/d, per gal., 6s 2d; 100-499 gal. in drums, d/d, per gal., 6s 6½d-6s 8½d.
Methyl Ethyl Ketone. All d/d. In 5-gal drums, £183; in 10-gal. drums, £173; in 40-45-gal. drums, under 1 ton, £148; 1-5 tons, £145; 5-10 tons, £144; 10 tons and up, £143; in 400-gal. tank wagons, £140.
Methyl *iso*Butyl Carbinol. All d/d. In 5-gal. drums, £203 ; in 10-gal. drums, £193 ; 40 45 gal. drums, less than 1 ton, £168 ; 1-9 tons, £165 ; 10 tons and over, £163 ; in 400-gal. tank wagons, £160.
Methyl *iso*Butyl Ketone. All d/d. In 5-gal. drums, £209; in 10-gal. drums, £199; in 40-45-gal. drums, under 1 ton, £174; 1-5 tons, £171; 5-10 tons, £170; 10 tons and up, £169; in 400-gal. tank wagons, £166.
***iso*Propyl Acetate.** In drums, 10 tons, d/d, £137; 45-gal. drums, d/d, £143.
***iso*Propyl Alcohol.** Small lots: 5-gal. drums, £118; 10-gal. drums, £108; 40-45 gal. drums: less than 1 ton, £83; 1-9 tons, £81; 10-50 tons, £80 10s; 50 tons and up, £80.

RUBBER CHEMICALS

Carbon Disulphide. According to quality, £61-£67.
Carbon Black. Per lb., according to packing, 8d-1s.
Carbon Tetrachloride. Ton lots, £83 15s.
India-Rubber Substitutes. White, per lb., 1s 8¾d to 2s 0½d; dark, d/d, per lb., 1s 3d-1s 5½d.
Lithopone. 30%, about £59.
Mineral Black. £7 10s-£10.
Sulphur Chloride. British, about £50.
Vegetable Lamp Black. 2-ton lots, £64 8s.
Vermilion. Pale or deep, 7-lb. lots, per lb., 15s 6d.

COAL-TAR PRODUCTS

Benzole. Per gal., min. 200 gal., d/d in bulk, 90's, 5s 3d; pure, 5s 7d.
Carbolic Acid. Crystals, min. price, d/d bulk, per lb., 1s 4d; 40/50-gal. ret. drums extra, per lb., ½d. Crude, 60's, per gal., 8s 4d.
MANCHESTER: Crystals, d/d, per lb., 1s 4d-1s 7d; crude, naked, at works, 8s.
Creosote. Home trade, per gal., according to quality, f.o.r. maker's works, 1s-1s 9d.
MANCHESTER: Per gal., 1s 2d-1s 8d.
Cresylic Acid. Pale 99/100%, per gal., 6s 6d; 99.5/100%, per gal., 6s 8d. D/d UK in bulk: Pale ADF, per imperial gallon f.o.b. UK, from 7s 8d to 9s 3d; per US gallon, c.i.f. NY, 100 to 118.5 cents freight equalised.
Naphtha. Solvent, 90/160°, per gal., 5s 3d; heavy, 90/190°, for bulk 1,000-gal. lots, d/d. per gal., 3s 11d. Drums extra; higher prices for smaller lots.
Naphthalene. Crude, 4-ton lots, in buyers' bags, nominal, according to m.p.: £19-£30; hot pressed, bulk, ex-works, £40; refined crystals, d/d min. 4-ton lots, £65-£66.
Pitch. Medium, soft, home trade, f.o.r. suppliers' works, £10 10s; export trade, f.o.b. suppliers' port, about £12.
Pyridine. 90/160, per gal., 15s.-17s 6d.
Toluole. Pure. per gal., 5s 6d; 90's, d/d, 2,000 gal. in bulk, per gal., 5s.
MANCHESTER: Pure, naked, per gal., 5s 6d.
Xylole. According to grade, in 1,000-gal. lots, d/d London area in bulk, per gal., 6s 2d-6s 6d.

INTERMEDIATES AND DYES

(Prices Nominal)

m-**Cresol** 98/100%. 10 cwt. lots d/d, per lb., 4s 9d.
o-**Cresol** 30/31°C. D/d, per lb., 1s.
p-**Cresol** 34/35°C. 10 cwt. lots d/d, per lb., 5s.
Dichloraniline. Per lb., 4s 6d.
Dinitrobenzene. 88/99°C., per lb., 2s 1d.
Dinitrotoluene. Drums extra. SP 15°C., per lb., 2s 1½d; SP 26°C., per lb., 1s 5d; SP 33°C., per lb., 1s 2½d; SP 66/68°C., per lb., 2s 1d.
p-**Nitraniline.** Per lb., 5s 1d.
Nitrobenzene. Spot, 90 gal. drums (drums extra), 1-ton lots d/d, per lb., 10d.
Nitronaphthalene. Per lb., 2s 5½d.
o-**Toluidine.** 8-10-cwt. drums (drums extra), per lb., 1s 11d.
p-**Toluidine.** In casks, per lb., 6s 1d.
Dimethylaniline. Drums extra, c.p., per lb., 3s 5d.

Course on Electrometric Methods at Norwood

ELECTROMETRIC methods will be the subject of a course to be held at Norwood Technical College on 7/8, 14/15 and 21/22 March. The main topics will be polarography, amperometric and coulometric titrations, controlled potential separations, and modern aspects of conductometric analysis and pH measurement.

Lecture-demonstrations will take place at 6 p.m. on Fridays followed by discussions at about 8 p.m.

For further details and applications for enrolment, apply to the Secretary, Norwood Technical College, London SE27.

New University Department

A department of physiological chemistry in the faculty of science and the faculty of agriculture is to be set up at Reading University. The department will be headed by Professor C. Tyler, professor of agricultural chemistry and it will absorb the existing department of agricultural chemistry.

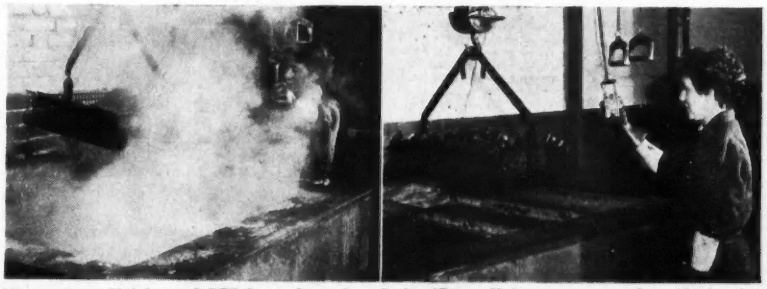
Determining Hardness of Vulcanised Rubber

A METHOD of determining hardness of vulcanised rubber is given in the British Standard 903, Part A7, 1957 which replaces part 19 of the 1950 issue of BS 903. In the new publication the base plate type gauge has now been omitted, and a slight alteration has been made in the relationship between the indentations and the BS hardness degrees. The latter alteration was made so that the values might prove acceptable to the International Organisation for Standardisation.

The standard includes the following: definitions ('stress', 'strain', 'Young's modulus'); a summary and explanatory note relating to the test; requirements for the test piece and the apparatus; procedure (preparation of sample, conditioning test pieces and samples, method of measurement, number of readings); a special table has been included for use with older type instruments.

Copies of the standard are obtainable from British Standards Institution, Sales Branch, 2 Park Street, London W1, price 4s.

Fume Eliminating Process by ICI



The paints division of ICI have introduced the 'Serseal' layer process for eliminating fumes and steam from aqueous metal treatment baths and for reducing heating costs. The process seals the liquid surface with a layer of inert material which checks fumes and steam and reduces the amount of heat needed to keep the bath at a working temperature. By using 'Serseal', fuel economies of up to 75 per cent have been recorded under production conditions, the company state. 'Serseal' was developed primarily for use in baths producing heavy phosphate coatings, but alternative grades are available to suppress acid fumes and spray from pickling tanks and to conserve heat in alkaline paint stripping vats. Above left, untreated dipping bath; right, after treatment with 'Serseal'

NEW PATENTS

By permission of the Controller, HM Stationery Office, the following extracts are reproduced from the 'Official Journal (Patents)', which is available from the Patent Office (Sale Branch), 25 Southampton Buildings, Chancery Lane, London WC2, price 3s 3d including postage; annual subscription £8.

Specifications filed in connection with the acceptances in the following list will be open to public inspection on the dates shown. Opposition to the grant of a patent on any of the applications listed may be lodged by filing patents form 12 at any time within the prescribed period.

AMENDED SPECIFICATION

On sale 19 March or as soon as possible thereafter

Roasting finely-particled sulphidic ores and other materials containing roastable sulphur. Badische Anilin- & Soda-Fabrik AG. **763 843**

ACCEPTANCES

Open to public inspection on 19 March

Synthesis of steroids. Olin Mathieson Chemical Corp. [Divided out of 792 223.] **792 225**

Gas purifiers of the tower type. Walker Ltd., C. & W., and Milbourne, S. M. [Addition to 733 109.] **792 096**

Production of cycloaliphatic aminoketones. Badische Anilin- & Soda-Fabrik AG. **792 190**

Amines. Du Pont de Nemours & Co., E. I. **792 115**

Nitro compounds. Du Pont de Nemours & Co., E. I. **792 116**

Fuel element for nuclear reactors. Physikalische Studienges, Düsseldorf. **792 170**

Refining the crystalline structure of hyper-eutectic aluminium-silicon alloys. Aluminiumwerke Nürnberg Ges. **792 172**

Mould release agents. Midland Silicones Ltd. **792 040**

Cyclic keto-alcohol. Hoffmann-La Roche & Co. AG. [Divided out of 791 953.] **791 954**

Open to public inspection on 26 March

Methods of and apparatus for the production of glass tube. British Heat Resisting Glass Co. Ltd. **792 293**

Cobalt-chromium alloys. Jessop & Sons Ltd., W. [Addition to 674 023.] **792 447**

Clear and pigmented oil-in-water resin emulsions. Auer, L. **792 466**

Manufacture of esters of the steroid series. Reichstein, T. **792 562**

Water-soluble alginate salts and a process of making same. Smit, A. O., and Smit, C. [trading as Smit & Zoon, A.] **792 468**

Steroidal compounds. Merck & Co., Inc. **792 410**

Alkoxy terminated siloxane polymers. Union Carbide Corp. **792 470**

Flameproofing compositions. Diamond Alkali Co. **792 368**

Wood preserving compositions. Hickson's Timber Impregnation Co. (Great Britain) Ltd. [Cognate application 17447.] **792 304 792 305**

Catalytic desulphurisation of petroleum hydrocarbons. British Petroleum Co. Ltd., Northcott, R. P., and Wilson, P. S. **792 567**

Condensation products of sulphaguanidine and formaldehyde and their production. Cilag Ltd. **792 449**

Preparing substituted hydrazines. Ohio State University Research Foundation. **792 471**

Catalytic desulphurisation of petroleum hydrocarbons. British Petroleum Co. Ltd., Moy, J. A. E., and Rowland, J. **792 496**

Production of thermoplastic sheet material. Celanese Corp. of America. **792 547**

Refinement of fissile metals. UK Atomic Energy Authority. **792 347**

Coal tar soft pitch product. Ges. für Teerverwertung. **792 248**

Manufacture of organic peroxides. Distillers Co. Ltd. **792 558**

Manufacture of veterinary preparations containing penicillin. Glaxo Laboratories Ltd. [Addition to 686 693.] **792 559**

Process for the manufacture of filaments of regenerated cellulose from viscose. Glanzstoff-Courtaulds Ges. **792 548**

Method of heat stabilising halogenated vinylic resin. Soc. Anon. des Manufactures des Glaces et Produits Chimiques de St.-Gobain, Chauny & Cirey. **792 308**

Bodies having films of carbon, boron and silicon deposited thereon and methods of making such deposits. Western Electric Co., Inc. **792 274**

Process for the production of shaped polyamide articles. Dynamit-AG. Vorm. A. Nobel & Co. **792 352**

Manufacture of titanium. Imperial Chemical Industries Ltd. **792 300**

Apparatus for gravity separation of materials in liquid media. Ore & Chemical Corp. [Addition to 754 796. **792 454**

Electrostatically depositing a liquid film on moving metallic strip. United States Steel Corp. **792 276**

Production of hardenable mixtures of polymerisable ethylenic derivatives and unsaturated polyesters. Farbenfabriken Bayer AG. **792 485**

Production of α-nitrilocarboxilic acid esters. Henkel & Cie. Ges. **792 486**

Producing galacturonic acid. Laboratoires Clevenot. **792 518**

Pyrolytic cracking of heavy oils. Dampskibsselskabet af 1912 Aktieselskabet, and Aktieselskabet Dampskibsselskabet Svendborg. **792 255**

Process for the treatment of liquid sulphur. Bahr, E. E. **792 560**

Cellulose ester textiled and compositions. Celanese Corp. of America. **792 337**

Organosiloxane resin compositions. Midland Silicones Ltd. **792 339**

Treatment of metals. Diamond Alkali Co. **792 421 792 422**

Rubber compositions. Goodrich Co., B. F. **792 535**

Alkylating paraffin hydrocarbons. Universal Oil Products Co. **792 395**

Dyeing artificial fibres. Badische Anilin- & Soda-Fabrik AG. **792 396**

Recovery of water-soluble aliphatic dicarboxylic acids. Celanese Corp. of America. **792 487**

Purification of sugar solutions. Dow Chemical Co. **792 284**

Dichlorobenzene manufacture. Columbia-Southern Chemical Corp. **792 542**

Substituted phenoxyacetic amides. Geigy AG., J. R. **792 490**

Glass. Kodak Ltd. **792 402**

Therapeutic composition. American Home Products Corp. **792 544**

Additives suitable for lubricating oil compositions. Esso Standard Soc. Anon. Francaise. **792 553**

Antibiotic preparation having a protracted effect. Novo Terapeutisk Laboratorium Aktieselskabet. **792 545**

Polyhydrophenanthrene compounds. Merck & Co., Inc. [Divided out of 792 410.] **792 412 792 413**

N⁴-dialkylsulphamoylsulphanilamides. American Cyanamid Co. **792 561**

Vinylic magnesium chloride complexes and method of making same. Metal & Thermit Corp. [Addition to 777 158.] **792 537**

Antiseptic compositions. Armour & Co. **792 538**

Preparation of di- and tri-alkyltin sulphides. Soc. Anon. des Manufacturers des Glaces et Produits Chimiques de St.-Gobain, Chauny & Cirey. [Divided out of 792 308.] **792 309**

Open to public inspection on 2 April

Methods of growing quartz crystals. General Electric Co., Ltd., Brown, C. S., and Kell, R. C. **792 724**

Preparation of titanium and other metals from their weakly-bonded covalent halides. National Research Development Corp. **792 638**

Device for the treatment and particularly the sterilisation of liquids. Vellas, J. L. J., and Puig, L. C. **792 620**

Curing of liquid polyepoxide resins. Imperial Chemical Industries, Ltd. **792 702**

Machine for dispensing liquids mixed together in pre-determined quantities. Supreme Automatic Vending Co. [Cognate application 30 565.] **792 666**

Devices for filtering or distributing liquids and gases. Zwicky, J. F. [Cognate application 20958.] **792 800**

Fluorescent screens. Du Pont De Nemours & Co., E. I. **792 840**

Fluorescent lamps, fluorescent lamp coatings, coating suspensions for coating fluorescent lamps and methods of coating fluorescent lamp tubes. Sylvania Electric Products, Inc. **792 773**

Compounded lubricating oils. Rhein Chemie Ges. **792 703**

Production of coloured cellulose acetate textile elements. Lansil, Ltd. [Addition to 780 851.] **792 705**

Preparation of aliphatic α -unsubstituted α : β-unsaturated carboxylic acids and their derivatives. Knapsack-Griesheim AG. **792 572**

Hydrocarbon conversion catalysts. Esso Research & Engineering Co. [Addition to 731 618.] **792 706**

Oxidation products from compounds of the steroid series and process of making same. Ciba Ltd. **792 803**

Electro-chemical treatment of metals and alloys. Charlesworth, P. A. **792 841**

Hydroforming processes employing alumina catalysts. Esso Research & Engineering Co. **792 806**

Manufacturing aluminium-coated copper wire. Imperial Chemical Industries, Ltd., and Manning, I. **792 774**

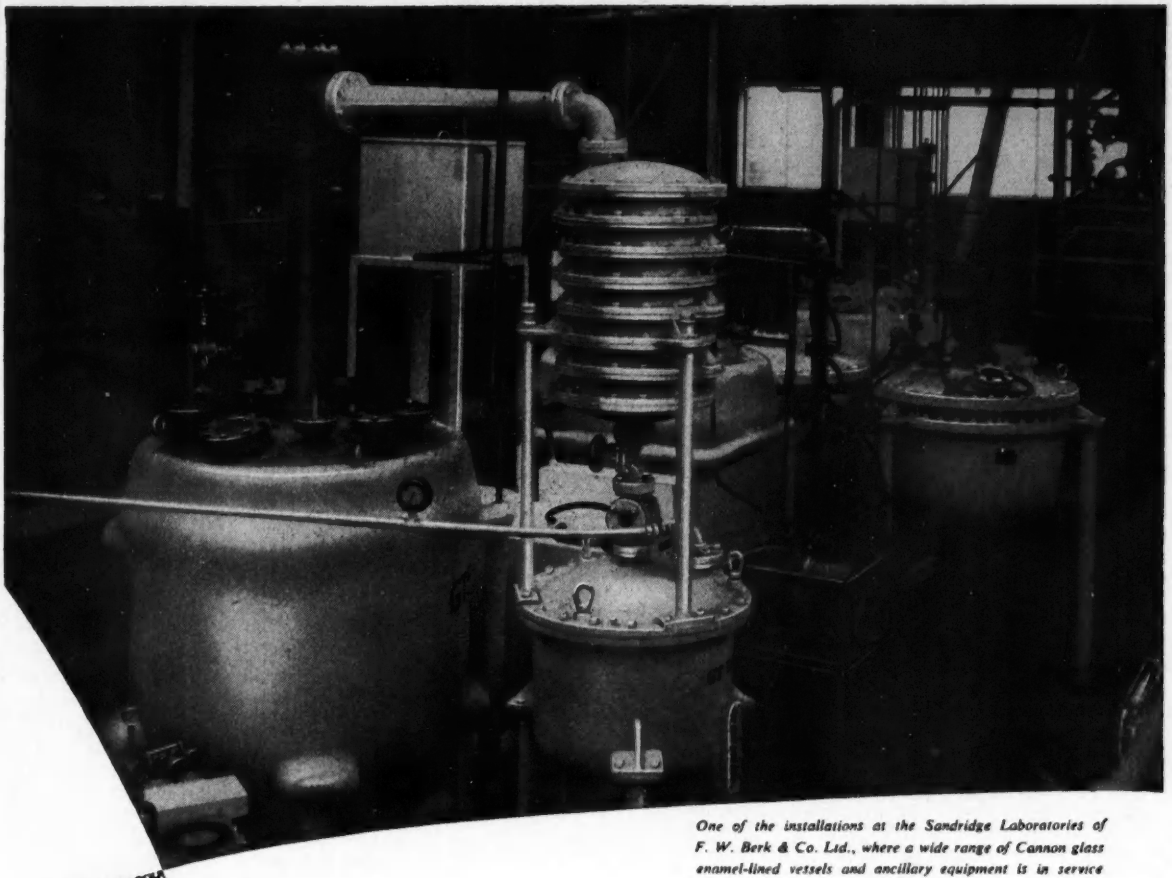
Operation of regenerative furnaces. Esso Research & Engineering Co. **792 843**

Refining process for use in the production of ground vegetable products. Ritter, K. **792 640**

Process for catalytic treatment of hydrocarbons. Hercules Powder Co. **792 827**

Polyethylene compositions. Hardman & Holden, Ltd. **792 828**

Fluid coking process. Esso Research & Engineering Co. **792 763**



One of the installations at the Sandridge Laboratories of F. W. Berk & Co. Ltd., where a wide range of Cannon glass enamel-lined vessels and ancillary equipment is in service

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acid resisting
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Behind each piece of Glass Enamel Lined Cannon equipment there is a century's experience in Iron Founding and Vitreous Enamelling, while up-to-date design and modern production methods ensure rapid delivery of Chemical Plant that will satisfy the most exacting demands of the Industry.

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Commercial News

Turnover Increase of 21 Per Cent Reported by Hickson and Welch

A 21 PER CENT increase in group sales and services is reported by Hickson and Welch (Holdings) for the year to 30 September 1957. Reporting this, the company's chairman, Mr. Bernard Hickson says that the increased profits which rose by £88,000 to £614,000, are the result of greater output, higher yield efficiency, and the earning power of new capital assets provided out of the high proportion of profits retained in the group each year. Sale prices of their major products at the end of the financial year were no higher, and in some cases were less than those 12 months ago, despite the rise in costs of raw materials, labour and services.

Hickson and Welch Ltd., the chemical company, have had a very successful year, with records in output, sales turnover and profit. Capital expenditure has been maintained at a high level; certain new plants have been completed, and work is in progress for still further extensions to production capacity. General services projects have not been neglected.

Reference is made by Mr. Hickson to the major reorganisation of the Huddersfield companies, John W. Leitch and Co. Ltd., and the Gardinol Chemical Co. Ltd., when the management was combined with that of Hickson and Welch Ltd. Chemicals made at Huddersfield are now sold by Hickson and Welch. The name of the Gardinol Chemical Co. Ltd., had been changed to Ronsheim and Moore Ltd., and it continues to supply specialised products to the pharmaceutical and cosmetic trades.

It is reported that an excellent start has been made in the first four months of the current financial year. The order position is in a healthy state and Mr. Hickson looks forward to results comparable with those of 1956-57, and the maintenance of dividends.

Group trading balances increased from £525,365 to £616,575 and the net profit from £202,612 to £251,397. Net additions of nearly £179,000 have been made over the past year to fixed assets which amounted to £1,066,725 (£961,304) at 30 September. Outstanding commitments for capital expenditure are estimated at £43,000 (£50,000).

The ordinary dividend is 17½ per cent on £700,000 capital (15 per cent on £550,000 prior to a scrip issue). A final dividend of 13¾ per cent has been recommended.

Borax Holdings

The board and management of Borax (Holdings) feel that the long-range outlook for the group's business is good, and that continued growth is to be anticipated. Despite signs of some recession of business throughout the world, states Mr. D. Abel Smith, chairman, an upward trend of both tonnage sales and profits is expected. Growth of the company is still based on old-established industrial uses of its products, but as a result of capital expenditures in recent years the group's ability to meet a growing demand for boron products is stated to be greater than ever.

Competition and costs are reported to be increasing in the potash business and lower fertiliser prices are in effect this year. However, the company believes that long-term prospects are promising as demand has been showing an upward growth of about 6 per cent a year.

Borax (Holdings) are to issue quarterly interim reports and figures for the quarter ended 31 December last will be available before the annual meeting. These figures, Mr. Smith says, will have been influenced somewhat by trade recessions in many countries and the difficulties of bringing the new California plants into operation. These have been partly overcome during the first quarter of this year.

Total sales in the UK reached a new high level in the year to 30 September 1957 and export sales held up well to the end of June last. Profits of US Borax and Chemical were lower owing to higher production costs, start-up expenses for the new boron operations, increased research expenditure and a material increase in interest paid.

Reference was made to the group's trading profits in CHEMICAL AGE, 25 January, p. 205. The profit and loss account includes the results of the first full year of trading by the new operating subsidiaries which came into being on the reorganisation of the group in 1956. Owing to the different circumstances thereby prevailing, Mr. Smith reports that a true comparison of the figures cannot be made.

Unilever Ltd.

Agreement in principle has been reached between Unilever Ltd. and the Norwegian company Borregaard regarding the sale of Unilever interests in De Nordiske Fabriker De-No-Fa and Lilleborg Fabriker to Borregaard for £4.5 million in cash. De-No-Fa owns a factory in Norway for the hardening and refining of oils and fats and Lilleborg owns oil and soap factories.

Bowmans Chemicals Ltd.

Results for Bowmans Chemicals Ltd. are reported by chairman, Mr. E. G. Turner, to have proved better than was expected. Increased costs in the year to 31 October 1957 have in general been covered by better prices for the company's raw materials and finished products on the lactic side of the business. Efforts are also being made by Bowmans to develop new products, and for this purpose a technical director, Mr. M. H. M. Arnold, has been appointed.

Profit for the year ended 31 October last before tax and after charging or crediting certain items is £37,183 (£35,266) (see also CHEMICAL AGE, 18 January, p. 174).

Hilger and Watts

Group profit of Hilger and Watts, scientific instrument makers, at £181,062 for the year ended 30 September 1957 compared with £123,479 in the previous year, is no less than 47 per cent up. Depreciation was £45,283 (£41,673). Tax absorbed £93,372 (£71,897) leaving a net profit of £87,690 against £51,582.

The final dividend has been raised from 7 per cent to 10 per cent, to make a total of 13 per cent on the £300,000 ordinary shares. The previous year's total was 10 per cent, of which the 3 per cent was paid on £225,000.

Ilford Ltd.

Photographic material manufacturers, Ilford Ltd., achieved a record turnover in the year ended 31 October last. The group net profit of £897,748 compares with £718,363 for the previous year.

The dividend is being raised from 15 per cent to 16 per cent. A year ago a special bonus of 2½ per cent was paid as part distribution from released tax provisions.

Key Glassworks

Final dividend announced by Key Glassworks is 14 per cent, making a total dividend of 20 per cent for the year ended 30 November 1957, on £767,000 ordinary shares (6 per cent interim on £600,000 and 14 per cent final on £767,000). Group profit before tax was £275,365 (£378,638). Taxation was £175,275 (£181,686).

Negretti and Zambra

Net profit reported by Negretti and Zambra, scientific instrument manufacturers, for the year to 30 September 1957, is £267,869 (£260,258) before tax of £126,031 (£131,405). A final dividend of 11 per cent (same) is being paid, making a total dividend for the year of 15 per cent (same).

Newton Chambers

Profits, subject to audit, of Newton Chambers and Co., are £858,907 for 1957, as against £753,349. After deduction of tax of £479,400 (£420,863 less £29,000 over-provided) there is a net profit of £379,507 compared with £361,486.

Final dividend for the year is being raised from 9 per cent to 10 per cent to make 16 per cent for the year, against 15 per cent.

Canadian Industries Ltd.

Canadian Industries Ltd. and subsidiary companies in 1957 had consolidated sales totalling $142,700,000, an increase of 10 per cent over 1956. Consolidated earnings for 1957 amounted to 98 cents a common share, against 97 cents in 1956.

Mr. H. Greville Smith, president, states that the gain in sales was general for most of the company's products, although the reduction in activity in certain segments of the economy affected business in the latter part of the year. Exports of Terylene and polythene were

considerably higher than in 1956.

The new hydrogen peroxide plant at Hamilton, Ontario, and a nitric acid plant at Beloeil, Quebec, were brought into operation late in 1957, while production of ammonia at Millhaven, Ontario, began in January, 1958, after delays in the start-up of equipment. Satisfactory progress is reported in construction of the company's two new sulphuric acid plants at Beloeil and Copper Cliff, Ontario, with completion of both new plants scheduled for early 1958.

ICIANZ

Profits of Imperial Chemical Industries of Australia and New Zealand have risen from £A.2,324,560 to a record £A.2,495,316 in the year to 30 September last. These record profits are due to reduced provisions for taxation and depreciation. The tax provision has been reduced from £A.1,980,735 to £A.1,785,550.

Group sales increased to a record £A.37.97 million, compared with £A.36.72 million previously. The ordinary dividend has been maintained at 9 per cent.

To meet the steady growth in demand for alkali, production capacity of ICIANZ's alkali plant is being increased.

Boots Pure Drug Co.

An interim dividend on ordinary of 3 per cent is to be paid by Boots Pure Drug Co.

NEW COMPANIES

BAUXITE RED LTD. Cap. £1,000. Prospectors, quarrymen, miners, manufacturers of ochres, dealers in crude and manufactured earths, ochres, oxides, etc. Directors: C. M. Beavis (director, Golden Valley Colours), E. Clayton (director, Bridge Colour Co.), P. Fairclough (director, Hall and Liverpool Red Oxide Co.), M. Hawley (director, W. Hawley and Co.), S. Key (director, Via Gillia Colour Co.). Reg. office: Wick, Bristol.

DARICK PLASTICS LTD. Cap. £1,000. Manufacturers of and dealers in thermoplastic, thermosetting, mica, rubber, resinous fibre-glass and other materials. Directors: M. Rickers and C. W. Davis. Reg. office: 65 Park Lane, Oldbury, Worcs.

ENGLISH AND WORRINGHAM LTD. Capital £75,000. Objects: To acquire the businesses of J. English and Co. Ltd., Edward Worringham and Co. Ltd., and Alfords (Lubricants) Ltd., and to carry on the business of dealers in, manufacturers, refiners, blenders, importers and exporters of oils, greases, fats, glycerine, chemicals etc. Directors: F. Bristow, A. Bristow, F. Bristow and W. Canning.

T. P. CHEMICAL ENGINEERING COMPANY LTD. Cap. £100. Manufacturers of chemical engineering machinery, etc. Directors: L. L. Samson and E. Samson. Reg. office: 64 Station Road, West Croydon, Surrey.

LONDON GAZETTE

Voluntary Winding-up

(A resolution for the voluntary winding-up of a company does not necessarily imply liabilities. Frequently it is for purposes of internal reconstruction and notice is purely formal.)

IODISED MINERALS LTD. At an extraordinary general meeting on 17 January, resolved that company be wound up voluntarily. James Stanley Heaton, chartered accountant, Halifax Permanent Chambers, Cavendish Street, Keighley, Yorks, is appointed liquidator. (All known creditors have been or will be paid in full.)

LIONITE CHEMICAL AND ASPHALT PRODUCTS LTD. F. N. Gollop, 101 Hatton Garden, London EC1, appointed liquidator. All known creditors have been or will be paid in full.

INCREASE OF CAPITAL

BRITISH CHROME AND CHEMICALS (HOLDINGS) LTD., Urlay Nook, Eaglescliffe, Stockton on Tees. Increased by £1,600,000, beyond the registered capital of £1,400,000.

Data on Gyra-flo Fan Range

TECHNICAL data on the Gyra-flo range of airfoil centrifugal fans is contained in a brochure published by the Midland Heating and Ventilation Co. Ltd., Bedford Road, Birmingham 11.

The Gyra-flow airfoil is a backward curved fan which is claimed to create less noise and absorb less power than other fan designs. During tests carried out to British Standard test codes it is stated that the fan showed efficiencies of over 90 per cent. Efficiencies of over 70 per cent were maintained over 55 per cent of the operating range and a reduction of 25 per cent in absorbed horsepower was effected.

Extensive tables are included which contain performance data, dimensions, friction data and recommended air velocities for various hoods and enclosures.

H&W

Dithiol

DITHIOL (Toluene–3:4–dithiol) has been widely used as a reagent for Tin, Tungsten and Molybdenum.

It has recently been shown to afford sensitive and highly selective reactions for other elements:—

COBALT, COPPER, THALLIUM, ANTIMONY etc. (*Analyst*, **82**, 177 [1957]) ARSENIC and GERMANIUM, (*Analyst*, **82**, 760 [1957]) and new analytical methods are still being developed for this extremely versatile reagent. Its colour reactions are spread over all the hues of the rainbow. With suitable choice of conditions, interference is readily controllable.

Stable derivatives of dithiol, developed for Hopkin and Williams Limited, by Dr. R. E. D. Clark, originator of the dithiol method for tin, are now available; see (*Analyst* **82**, 182 [1957]).

H&W

Code No.		
3627	**DIACETYL DITHIOL**	Stable white crystals. Can be readily hydrolysed to dithiol.
3650.7	**DIBENZOYL DITHIOL**	Source of dithiol. Reagent for palladium.
9135.3	**ZINC DITHIOL**	Stable white powder. Gives dithiol reactions when dusted on surface of solutions. Sensitive reagent for arsenic and germanium.

These substances are the subject of a British Patent Application

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